

The OTB

OFFICIAL JOURNAL OF
THE ANTIQUE WIRELESS
ASSOCIATION, INC.

THE OLD TIMER'S BULLETIN OCTOBER 2004 VOL. 45 / #4

*Published for the collector,
historian and old-time
radio operator*

"Little Nipper" takes over flea marketer's seat. See "From the Editor."



PHOTO BY TOM PERERA

CONFERENCE 2004 RETROSPECTIVE ISSUE

TIME-SENSITIVE PROXY MATERIALS ENCLOSED

PLEASE REVIEW AT ONCE!

THE OLD TIMER'S BULLETIN

OFFICIAL JOURNAL, ANTIQUE WIRELESS ASSOCIATION, INC.™

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THE PRESIDENT'S MESSAGE

Greetings,

It was a pleasure meeting the membership at the Annual conference in Rochester New York. We do not get together often enough. But it seems like only yesterday when we were gathering for the 2003 event. Time flies when you are having a good time! I hope that all who attended the conference had an enjoyable time and came away satisfied and with maybe a few new treasures. I know I did.



The membership forum was well attended this year and many new ideas were put forward about how to make the AWA better and more accessible to the public. The board will be looking at all of the suggestions at its next meeting in November. A big THANK YOU to all who attended the meeting.

Now for some statistics on the meet. There were 660 total registered attendees, a little down from last year. We sold 216 of our potential 260 paved area spots, as well as many more on the grassy area, yet many spots were empty. Where was everybody? I suppose the weather had something to do with it. We had a little bit of rain on Wednesday and then some on Thursday. To buy a seller's spot and not show up just doesn't make sense. The auction was one of the high points on the conference. We sold over \$32,500 at the main

auction and about \$5,000 at the tube auction. Not too bad for a slow year. The Old Equipment Contest was full to overflowing this year. We had some wonderful displays and many great entries. Look at the contest results in this issue to see what you missed!

Next year's conference will be held at the RIT Inn in Rochester, NY on August 23-27, 2005. The theme will be Western Electric. So mark your calendars and get your vacation schedule set for next year.

On a different subject I am pleased to announce the Antique Radio Club of Illinois is now an AWA affiliate. I attended their meet at Elgin, IL, just a week before our conference. I welcome them into the AWA family. We have also had inquiries from the Pittsburgh Antique Radio Society and the Buckeye Antique Radio and Phonograph Club. Thanks to all who help promote this great club of ours. You will be hearing more about promoting and growing of our club in the coming issues.

Well enough for now, but I am always eager to hear from you.

If you have any questions or comments feel free to contact me, But please no calls after 9:30 p.m. (Eastern time), if possible.

Geoffrey Bourne

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LETTERS TO THE EDITOR

All letters to the Editor are read with interest and attention, though not all can be published in this column. Letters may be paraphrased, shortened or otherwise edited to fit the available space. The statements made by our correspondents are their own opinions and do not necessarily reflect the views of either the OTB staff or the Antique Wireless Association.

IHRS SPRING MEET A GREAT SUCCESS

The Indiana Historical Radio Society celebrated an important event in Hoosier history this May at their 33rd annual AWA/IHRS Spring Meet in Kokomo, IN. It was the development, 50 years ago, of the first transistorized pocket radio. This was the Regency TR-1, produced by the IDEA Company of Indianapolis.

The Regency TR-1 theme was carried throughout the meet events, which included seminars on Regency history and transistor radio troubleshooting techniques. There were also several exciting displays of Regency advertising and many colorful examples of the TR-1 itself, in-

cluding one with a clear case. Dr. Ed Taylor, co-founder of IHRS, was awarded the Best of Show trophy for his elaborate Regency display which included a full size mannequin dressed in period regalia and holding a TR-1 in her hand. Bill Morris also had a very elaborate Regency display.

Other events worth noting were the operating radio displays and old equipment contests. All were well attended and received. Of particular interest was an extremely rare Delco-Remy 1929 automobile radio built for the 1930 Cadillac and LaSalle 353 and 340 series of cars. This was the first Delco radio. It was built in Anderson, IN.

The radio collection of member James McDonald was auctioned off. A total of 136 items were sold in-

FROM THE EDITOR

On the Cover

Strolling through the flea market at Rochester, I was stopped by Tom Perera as I was passing his key and telegraph display tables. He had a big smile on his face and told me he had a great picture for The OTB. When I saw how he was positioning his digital camera to give me a look at the screen, I became very interested. Good vertical pictures suitable for a Conference Retrospective Issue cover are hard to come by.

What he showed me was a shot he had taken of Bill Barren as he was passing by. Bill usually rides around the flea market on his electric scooter. But this time he was guiding the scooter along as he walked next to it. Occupying the driver's seat was a large RCA "Little Nipper" dog, apparently a recent purchase. The dog was looking slightly bored with the proceedings, though it was apparent that he considered the scooter ride to be no less than his just due.

Thanks to Tom for this fun shot and to Bill for his gracious permission to use it on the cover.

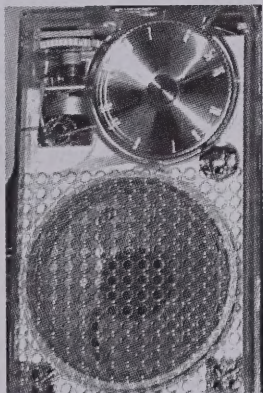
E-Mail Address Change

I've changed my e-mail contact listing on page 2 to a college alumni forwarding address. The actual address hasn't changed yet, but it will soon because I'll shortly be installing DSL service. Right now, messages sent to mfellis@alum.mit.edu will be forwarded to my current address, but they'll be sent to the new address after I change providers.

Watch For a New Look

Pending the likely approval of the board at the upcoming November meeting, *The OTB* will have a new name beginning in January. I can't say more now; this is just a "heads up" to keep you from being too surprised. The cover design will remain essentially the same.

This rare clear-case Regency TR-1 was displayed at the IHRS Spring Meet.



cluding a rather rare AK-12C, which was in excellent condition. Only about 8400 of these radios were built. It is unknown how many exist today.

The Awards Banquet, a popular catered buffet event, was sold out to capacity. The Best of Show trophy and other awards from the old equipment contest were announced at the banquet. The annual free drawing for an antique radio was won by Karl Johnson of Chicago. It was a Radiola III in excellent condition.....a great prize.

The meet was held at the new, air conditioned, Johanning Civic Center in Kokomo, which has proven to be an excellent venue. The event was attended by 122 families from 12 states, including CA, GA, MN, OR and TX.

HERMAN GROSS
via e-mail

MALCOLM BAIRD'S TAYLOR AWARD SPEECH

This award was presented at the 2004 annual conference of the Antique Wireless Association.

It was founded by John P. Taylor, a former Vice President (sales) of the Radio Corporation of America, who recognized the need to preserve television history. Following is an edited excerpt from the presentation speech by Malcolm Baird, honorary President of the Narrow Bandwidth Television Association (NBTVA) and son of pioneering television inventor John Baird.

It is a great pleasure to be here in Rochester once again, and I'd like to introduce my son Ian who is also with us tonight. We have come down from Canada to take part in the Association's recognition of the historical work of Ed Gable, Curator of the AWA Museum in Bloomfield, N.Y. Specifically we recognize his February, 2003 role in recreating one of the milestones of television broadcasting.

Early in 1928, my father arranged for the first ever transmission of television across the Atlantic. Two members of his company, Oliver Hutchinson and Ben Clapp, brought the receiving apparatus from London to the U.S. and connected it to the short wave receiver of Robert Hart, a radio amateur who lived, in Hartsdale, New York.

After several trials on 45 metres the system worked well. It was demonstrated on February 8th to a representative of Reuter's press agency. There was great interest in the event on both sides of the Atlantic. The New York Times compared the achievement to Marconi's feat, just 26 years earlier, of sending the letter "S" across the Atlantic.

The Baird family was delighted to hear about

the NBTVA's February, 2003 initiative in recreating this historic transmission, this time on a wavelength of 15 metres. It could not have been achieved without the participation of Ed Gable, who designed the receiver and operated it at AWA Museum Station W2AN...with some slight bending of the FCC rules! Excellent pictures were received, subject to the restrictions of the 30-line definition.

Technological history is sometimes seen as a dry and complicated subject of little public interest. But it can be brought to life with working models, and that is exactly what was achieved in the demonstration February 2003 demonstration.

On behalf of the Antique Wireless Association, it gives me great pleasure to present you, Ed Gable, with the J.P. Taylor Award for the preservation of the history of early television.

MALCOLM BAIRD
via e-mail

RADIOLA 18 CONVERSION COMMENT

In "Breadboarding" for July, 2004, Dick Parks described raising the tuning range of a Radiola 18 by removing 2 stator plates from each gang of the tuning capacitor sections. Occasionally, and everybody does it, we get so involved in what we set out to do that we lose sight of what can happen that was not intended.

My capacitor bridge says that the maximum capacity of each section of my 18 is about 325 pF; Minimum is about 70 pf. Removing 2 plates of the 9 would result in a maximum capacity of about 255 pF plus stray capacity. The minimum cap. would be less affected because of stray capacity to the frame and the rotor shaft, probably in the range of 60 pF or so.

Using the original 325 pF and plugging into the formula $L = 25330 / CF^2$ using appropriate units, we find that inductance required to tune down to 540 kHz is about 267 microhenrys. But with the new 255 pF value, the circuit would tune down to only about 600 kHz. With a minimum capacity of about 60 pf, the top end would be about 1530 kHz which was the goal. To reach down to the original 540 kHz would require that the coil inductance be raised to about 340 microhenrys, which would require that the minimum capacitance of the variable capacitors be about 33 pf, probably not possible with this particular capacitor.

JOHN T. KAETZ, JR.
Bessemer, AL

John shows us the value of algebra in radio engineering. However, I should have mentioned that

my goal was to tune between at least 630 to 1500 Kc, so as to receive the main stations here in the Washington DC area. We have an all-talk station here at 570, but all they do is talk.—Dick Parks

HEADSET CORRESPONDENCE

The "Ultimate Headset List" in the Feb. 1992 OTB is a nice reference that I use frequently. Suspecting that other collectors may also, here's an addition to it: Harvey Wells Electronics Inc., 150 ohms (This set is different than the "Harvey Wells" set listed.)

Thanks for the letter. You might have missed a very substantial update of the 1992 list, which we published in the February, 1999 issue as "The Master Headset Finder." The update shows a Harvey Wells "dual 75-ohm" unit. I don't know if that means 75 ohms per receiver—therefore 150 ohms total?—ed

Thanks for the later reference. The Harvey Wells "75 ohm dual" set listed there (and on the earlier list) is a 75 ohm set (each earpiece about 38 ohms). They are marked "Harvey Wells" Southbridge Mass. I recently sold such a set on Ebay.

The one I mentioned is a 150 ohm set, marked "Harvey Wells Electronics Inc." Southbridge Mass. I have this set, and it is a different set from the one listed. Maybe someone out there is trying to keep the list up with new finds and can use this info.

TOM FRENCH, W1IMQ
via e-mail

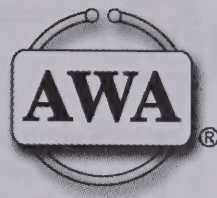
PUP PROBLEMS ANALYZED

Having read Dave Kraeuter's article "Is This Pup Distempered?" (May, 2004 *The OTB*), I dusted off my own Pup and brought it to my laboratory. First I checked capacitance and leakage resistance of the grid and 'phone capacitors. Grid: 250 pF, leakage 200 megohms; 'phone: 500 pF, leakage 30 megohms. These capacitances are standard for grid leak detectors operating in the broadcast band. The slight leakage of the 'phone condenser is inconsequential. The grid leak measured about 4 megohms.

I installed a type '30 tube and fired up the set using a two-volt storage cell for the A battery a "B" eliminator set at 23 volts for the "B" supply. My antenna was 75 feet long and 15 feet high and the ground was made to a well casing.

An ammeter was connected in series with one filament lead to make sure the tube was drawing its rated current of 0.06 ampere with the rheostat set at full "on." Simply checking for two volts at the tube socket would not been sufficient since

(continued on page 13)



OTB POLICY ON PROMOTING EVENTS: The OTB is pleased to list the meets and meetings of any established antique radio organization, whether or not it is associated with the AWA. Do not send your information directly to the OTB Editor. Please send it to Joyce Peckham, Box E, Breesport, NY 14816. Closing date is six weeks prior to first day of month of issue.

Calendar of AWA Activities

CCAWA Events Summary (See Calendar of Meets)

November 12-14

VPRS/AWA Annual Convention

November 14

AWA, Inc. Membership and Board Meeting

November 14

AWA Museum Membership and Board Meeting

August 23-27, 2005

AWA Annual Conference

Calendar of Meets

(AWA logo identifies AWA-sponsored events)

CCAWA EVENTS SUMMARY

All swap meets take place on Saturday mornings from about 7 a.m. until 12 noon. Vendor setup is only \$5. Admission is always free.

- October 23rd, 2004, Fall Swap Meet, Greensboro NC.
- December 18th, 2004, CC-AWA Christmas Party.
- January 29, 2005, Winter Swap Meet, Columbia SC.
- March 24-26, 2005, Annual Conference, Charlotte NC.
- May 7th 2005, Spring Swap Meet, Spencer NC.
- July 30, 2005, Summer Swap Meet, Valdese NC.
- October 22, 2005, Fall Swap Meet, Greensboro NC.

Executive Committee meeting dates. All meetings start at 2 p.m. Sunday afternoon and end at around 5 p.m.

2004: August 8th, November 7th; 2005: February 6th, May 1st, August 7th, November 6th.

VRPS/AWA ANNUAL CONVENTION

November 12-14

This event celebrates Vintage Radio and Phonograph Society's 30th year. You'll enjoy three live auctions, three silent auctions, old equipment contest, technical sessions, a demonstration of an operating 1928 scanning disk TV, flea market.

and awards banquet. There'll be door prizes and raffles, and all paid attendees will receive a very nice gift. Entertaining at the banquet will be the "Dallas Blend," a barbershop quartet from the internationally famous singing group *Vocal Majority*. During the concert Rick Wilkins, phonograph historian and collector, will record some of the songs using circa 1893 equipment. Convention hotel is The Hampton Inn and Suites, 1700 Rodeo Drive, Mesquite, TX 75149. Phone 1-800-hampton; mention VRPS and get the convention rate of \$69.00 per night.

AWA, INC MEMBERSHIP AND BOARD MEETING

November 14

AT RIT Conference Center (see above). Membership meeting at 11 a.m. All members welcome. Board meeting follows.

AWA MUSEUM MEMBERSHIP AND BOARD MEETING

November 14

Same location as above. Membership meeting (all members welcome), followed by Board meeting, begins at conclusion of AWA, Inc. Board meeting.

Recurring Meetings & Events

•Antique Radio Collectors of Ohio—meets first Tuesday of each month at 2929 Hazelwood Ave., Dayton, OH (4 blocks east of Shroyer Rd. off Dorothy Lane) at 7 p.m. Also annual swap meet and show. Membership: \$10.00 per year. For more info, contact Karl Koogler: mail to above address; phone (937) 294-8960; e-mail KARLKRAD@GEMAIR.COM

•California Historical Radio Society—For info on current meetings, call the CHRS hotline: (415) 821-9800.

•CARS, the Cincinnati Antique Radio Society—Meets on the third Wednesday of each month at The United Methodist Church, 7388 E. Kemper Rd. For more information contact Tina Hauke at (513) 247-9406.

•Carolinas Chapter of the AWA—Hosts four "mini-swap-meets" each year (in January, May,

With the Chapters

It's hard to believe that it's already September. I guess what the old folks used to say is true. The older you get, the faster time passes.

I'm writing this on Wednesday evening, September 8th. We just spent this past Friday and Saturday at the Shelby Hamfest. I got to see a lot of club members there, it could almost be an antique radio meet, there were so many.

If you've never been to Shelby you owe it to yourself to check it out. I went to my first Shelby Hamfest in 1970 with my high school electronics teacher, Rick Bilbro, K4KAV, and have only missed about three since then.

In 1978 Robert Lozier, Brian Harrison, Bob VanSleen and I put on our first antique radio display there. That display is what led to our hosting the first AWA Southeast meet in 1979 and the eventual forming of the CC-AWA.

We're getting ready to make a little road trip later this month with a 30-foot race car trailer to load up a large estate collection that has been consigned to us to be auctioned at next year's Charlotte conference. There are 200+ lots of very nice, mostly 20s era radios.

There are also two early kit TVs and a five-inch Edison cylinder player. One of the sets is a "one of a kind" that was built as an engineering study in the RCA engineering lab at Camden

NJ. There's a list of the items inventoried so far, and some photos of the collection on our club Web page at www.cc-awa.org.

On Sunday, August 8th, the CC-AWA Executive Committee met at the WBT studios to go over the re-write of the by-laws. It's a slow process, but it'll be right when we're done.

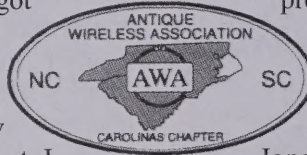
The next event on the CC-AWA calendar is our always great Fall Swap Meet in Greensboro NC. Brad

Jones does a great job of putting this event together every year. We typically have 30 to 50 vendors and more than 100 shoppers.

This meet, as all CC-AWA swap meets, happens on Saturday morning from about 7 a.m. until 12 noon, vendor setup is only \$5, and admission is always FREE. You can find detailed driving direction on the CC-AWA's Web page.

Mark your calendars now for the 2005 CC-AWA Annual Conference in Charlotte NC, the 29th Annual "Spring Meet in the Carolinas" on Thursday, Friday, and Saturday, March 24-25-26, 2005. As with all CC-AWA events, full details are available on our Web page.

Ron Lawrence, KC4YOY
CC-AWA President & Conference Chairman
 P.O. Box 3015, Matthews, NC 28106-3015
 704-289-1166 (home) after 6 p.m.
kc4yoy@carolina.rr.com



July and October) plus an annual conference, "Spring Meet in the Carolinas," on the 4th weekend in March. Executive committee meets approximately quarterly. For more info, visit the web site at CC-AWA.ORG or contact Ron Lawrence, KC4YOY, Chapter President, P.O. Box 3015, Matthews, NC 28106-3015; phone (704) 289-1166; e-mail kc4yoy@trellis.net

•Central Ohio Antique Radio Assn.—Meets at 7:30 p.m., third Wednesday of each month at Devry Institute of Technology, 1350 Alum Creek Rd., Columbus. (1-70 Exit 103B). Contact: Barry Gould (614) 777-8534.

•Delaware Valley Historic Radio Club—Meeting and auction begins 7:30 p.m. on the second Tuesday of each month. Location: Telford Community Center on Hamlin Ave. in Telford, PA. Annual dues: \$15.00, which includes a subscription to the club's monthly newsletter *The Oscillator*. For more info contact Delaware Valley Historic Radio Club, P.O. Box 5053, New

Britain, PA 18901. Phone (215) 345-4248.

•The Downer's Grove (IL) Park District Museum sponsors a monthly "Collector's Hour." Participants have the opportunity to display collections at the facility for several weeks before making their individual presentations. The event is open to the public with no admission charge. The museum has also begun to sponsor a yearly "Collector's Fair." For more info, contact Mark Harmon, The Downer's Grove Park District Museum, 831 Maple Ave., Downer's Grove, IL, 630-963-1309, fax 630-963-0496, mharmon@xnet.com.

•Houston Vintage Radio Association (HVRA)—Meets monthly on the second Tuesday (April thru Oct) at Bayland Park, 6:30-9 PM in SW Houston. March and November meetings are held on Saturdays at the American Legion Hall off Alba Street in North Houston at 9 AM. Each meeting includes an auction and program. Two one day auctions are held each spring and fall. An annual convention is held in February. A

newsletter, *The Grid Leak*, is published monthly. Membership is \$20/yr. Web site: www.HVRA.org. Write: HVRA, PO Box 31276, 77231-1276 or call Bill Werzner 713-721-2242 (e-mail: mingqi53@sbcbglobal.net).

•Hudson Valley Antique Radio & Phono Society—Meets third Thursday of month, 7 p.m. Meeting, swap meet, and membership info: Peter DeAngelo, President, HARPS, 25 Co. Rt. 51, Campbell Hall, NY 10916. (914) 496-5130.

•Indiana Historical Radio Society—Meets quarterly in Feb., May, Aug or Sept and Oct. Flea market and Old Equipment Contest at all events. Auctions at all but Feb meet. The *IHRB Bulletin* has been published quarterly for the past 32 years. For meet details and information about the club and our Indiana Historic Radio Museum in Ligonier, IN see our Web site at www.indianahistoricalradio.org or contact Herman Gross, W9ITT, 1705 Gordon Dr., Kokomo, IN 46902-5977, (765) 459-8308, w9itt@mindspring.com

•London Vintage Radio Club—This Ontario, Canada club meets in London on the first Saturday of January, March, May, June and November. Annual flea market held in Guelph, Ontario in September in conjunction with the Toronto club. Contact: Lloyd Swackhammer, VE3I1A, RR#2, Alma, Ontario, Canada N0B1A0. (519) 638-2827. E-mail contact is Nathan Luo at lvrcreditor@yahoo.com.

•Mid-Atlantic Radio Club—Meets monthly, usually the third Sunday of the month at the New Hope Seventh Day Adventist Church, Burtonsville, MD. Contacts: President, Geoff Shearer, 14408 Brookmere Dr., Centreville, VA 20120, e-mail gshearer@cox.net; Membership Chair, Paul Farmer, (540) 987-8759, e-mail: oldradiotime@hotmail.com. Website www.maarc.org

•New Jersey Antique Radio Club—Meets second Friday each month, 7:30 p.m. Holds three annual swap meets. Contact (send SASE) Phil Vourtsis, 13 Cornell Pl., Manalapan, NJ 07726, (732) 446-2427.

AWA LIFE MEMBERSHIPS ARE NOW AVAILABLE

AWA

Cost: \$400 (U.S.), \$500 (elsewhere). Send your check to AWA Secretary Joyce Peckham, Box E, Breesport, NY 14816. Phone (607) 739-5443. E-mail: awaapeckham@aol.com.

•Northland Antique Radio Club—hosts four events with swap meets each year (in February, May, September and November) including an annual conference, “Radio Daze,” for two days in mid-May. Annual dues are \$12.00, which includes a subscription to the club’s quarterly newsletter. For more info, visit our web site at www.geocities.com/northland.geo/; contact Ed Ripley at (651) 457-0085; or write NARC, P.O. Box 18362, Minneapolis, MN 55418.

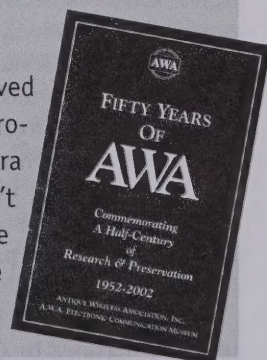
•Northwest Vintage Radio Society—Meets second Saturday of each month (except July and August), at or about 10 a.m., at Abemathy Grange Hall, 15745 S. Harley Ave., Oregon City, OR. Members display radios, exchange information. Guests welcome at all meetings and functions, except board meetings. For info, write the Society at P.O. Box 82379, Portland, Oregon 97282-0379.

•Oklahoma Vintage Radio Collectors—Oklahoma City Chapter meets second Saturday each month at Hometown Buffet, 3900 N.W. 63rd St., Oklahoma City, OK. Visitors welcome. Dinner/socializing, 6 p.m.; meeting at 7 p.m. Membership, \$12/yr., includes monthly *Broadcast News*. Info: SASE to OKVRC, P.O. Box 50625, Midwest City, OK 73140-5625; or contact Fred Karner at (405) 769-4656 or fkarner@cox.net; or visit our web site at <http://members.cox.net/okvrc/>

•Ottawa Vintage Radio Club—Meets monthly (except June and July) in the Conference Room, *Ottawa Citizen*, 1101 Baxter Rd., Ottawa, Ontario, Canada. Contact: Lea Barker at (613) 829-1804 or check www.ovrc.org. Membership: \$10 Canadian/yr.

50TH ANNIVERSARY COMMEMORATIVE BOOKLET

Our 50th anniversary commemorative booklet *Fifty Years of AWA* has received high marks from everyone who has seen it. We still have a stock of this profusely-illustrated 60-page AWA history available for those who would like extra copies or those who were not members at the time of distribution and didn’t receive one. Cost is \$7.00 per copy postpaid, no limit. But once they’re gone they’re gone—so act now if you are interested! Send your check to Joyce Peckham, Box E, Breesport, NY 14816.



•Pittsburgh Antique Radio Society welcomes visitors to our Saturday flea market/contests in March, June, September, and December. An auction is included in September, and our annual luncheon/program is held the first Saturday in December. Our newsletter, *The Pittsburgh Oscillator*, is published quarterly. website: www.nb.net/~schaefer/pars.html For directions, specific dates, information call President Bonnie Novak at 412-481-1563 or write to Karl Laurin, 8111 Sally, White Oak, PA 15131.

•Society for Preservation of Antique Radio Knowledge—Meets at 7:30 p.m. the second and fourth Tuesdays of each month in the party room at Cassano's Pizza Parlor, 1700 East Stroop Rd., Kettering, OH. Membership, \$18/year. Write SPARK Inc, P.O. Box 292111, Kettering, OH 45429; e-mail sparkinc@juno.com or call John Pansing at (937) 299-9570.

•Texas Antique Radio Club—Meets alternate months in Kyle and Shertz, TX. Contact: Ron Manning, President TARC, 133 East Huisache Ave., San Antonio, TX 78212. Phone (210) 734-6831; e-mail ronmeg@gateway.net; website www.gvte.com/~edengel/TARC.htm

Service Sources Available

The AWA Source Sheet is a listing of parts suppliers and services for the radio collector. Cost: only a business-size self-addressed stamped envelope to AWA, Box E, Breesport, NY 14816.

AWA VHS Video Programs

The Antique Wireless Association has available several historical documentaries to loan to affiliated organizations for club meetings and programs. There is no charge for this service other than return mailing cost. For info on loan conditions, to make reservations, or just inquire, contact Ed Gable, Curator, AWA Electronic Communication Museum, 187 Lighthouse Rd., Hilton, NY 14468. The following are available:

V-2 — "Electrons on Parade." 18 min. 1938 movie made at RCA's Harrison Plant showing production lines with closeups showing receiving tubes, including a short sequence on transmitting tubes. (Very rare movie.)

V-4 — "The British Receiver." Documentary of the AWA/BVPS meet with visit to Marconi's Chelmsford plant, the British Science Museum, and ending with series of collectible British receivers. (VHS program transferred from slides.)

V-5 — "The Early Years." Historical documentary narrated by Clarence Tuska telling of the

early years of amateur radio, founding of the ARRL and WWI military radio training school. (VHS program transferred from slides.)

V-6 — "The Key." History of the telegraph/radio key covering early hand keys, semi-automatics and commercial types. Script by Lou Moreau, W3WRE. (VHS program transferred from slides.)

V-9 — "The Transatlantic Tests and 1BCG."

AWA NETS

(EASTERN TIME)

PHONE

SUNDAY:

7237 kHz, SSB, noon (NCS: WA4IAM); 3837 kHz, AM 4:30 p.m. (NCSs: KA2J & W2AN)

TUESDAY:

14274 kHz, SSB, 2:30 p.m. (NCSs: KC3YE and W0FX); 3837 kHz SSB, 8 p.m. (NCS: WB2SYQ)

MONDAY-WEDNESDAY-FRIDAY:

The AWA Bruce Kelley HF Net
3867 kHz, SSB, 9:30 a.m. (NCS: W2OBJ)

CW

DAILY, 4 p.m., 3588 or 7050 kHz. Protocol, informal. Check both frequencies for activity and join in, or call AWA de (your call) and see what you stir up. First WEDNESDAY of each month, 8 p.m., 7050 kHz

2-M REPEATER (Rochester Area)

MONDAY, 7:30 p.m. (NCS: K2GBR)

Receive 145.290 MHz / Transmit 144.690 MHz

Rare documentary/photographs showing early amateur operation leading to famous 1921 transatlantic tests.

V-12 — "Those Wonderful Magazine Covers." The story of radio through magazine covers. Colorful with period music.

V-15 — "The WHAM Story." Details development of a pioneer radio station in Rochester, NY. Program developed with assistance and recollections of Art Kelly, the station's former general manager.

V-16 — "The Charles Herrold Story." Video prepared by Mike Adams who donated this copy to the AWA. It documents the work of broadcasting's Forgotten Father who started broadcasting in 1912. Now also available in DVD format as well as VHS.

MUSEUM NEWS

Visit us on the Internet at <http://www.antiquewireless.org>

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Allan Pellnat, KX2H

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Edward M Gable, KZMP
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**also on AWA Inc. Board of Directors*

MUSEUM CONTACT

For all inquiries about the Museum and its operation, contact Edward M. Gable, Curator, 187 Lighthouse Rd., Hilton, NY 14468. Phone: (585) 392-3088, e-mail: egable@rochester.rr.com.

The AWA. Electronic Communication Museum is an IRS 501(c)3 charitable organization.

Greetings from your Museum crew. The big news in this issue must be the just-completed AWA Annual Conference. It was, as always, great seeing all of our old friends and meeting new ones. The Wednesday night Museum/Annex opening was a real delight and both venues offered standing room only. As has been recent practice, special demonstrations were held at the Annex.

This year visitors were greeted with "green boxes" as our newest Army acquisitions were shown off. We are pleased to have a complete 64 line multiplexed telephone system in a portable MIL shelter. The "mpxed" telephone signals then go to the next shelter where four GHz microwave links are established using three-foot dishes and 50-foot portable towers. Next to that was dis-

played a smaller shelter, a GRC-46 HF SSB/RTTY system using a T-195/R-392 set up. The GRC-46 shelter, and its RTTY equipment, is fully operational. Special thanks to Roy Wildermuth, W3RLW, and Duncan Brown, K2OEQ, for their tireless efforts in setting up these displays for your enjoyment.

Also shown was our new set of Technical Material Corporation equipment, representing the last of the great tube type receivers and transmitters. You may recall that this is the equipment, reported on in the last issue, that was acquired from an underground Civil Defense bunker in Newark, NY. We learned that an identical system had been in use at a now-abandoned site in Batavia, New York. In the finest AWA tradition we arranged a trip to that location. Arriving there we found a parking lot,

ROBERT WILLIAM PERRY, W2TIX

We are deeply saddened at the passing, at age 71, of Bob Perry. Bob was a dedicated member of the AWA Museum staff, where he was the Registrar and Assistant Librarian. He further held elected positions of Museum Trustee and Secretary. Bob retired from Corning Glass Works, where he held various lead engineering positions and at one time was responsible for building most of the nation's CRT glass support rods. He was a 47 year veteran of the Sports Car Club of America and held a Chief Steward position at the famous Walkins Glenn race track. He and his wife, Eleanor, sang in

many local church choirs including that of his own church, The Episcopal Church of the Redeemer in Addison, NY. Bob was a dedicated family man and enjoyed nothing more than having his sons, daughter, and grandchildren, all gathered at annual family reunions. Bob brought to the Museum staff a ready wit, stories that were always entertaining, skills to do any job, and a sense of maturity and wisdom.

Robert William Perry, you are terribly missed—Ed Gable. *(You'll find a little more about Bob in the "Silent Keys" column in this issue.—ed)*

good for 100 cars, almost completely overgrown with trees and weeds growing out of the pavement.

Entrance to the underground site was through a round tunnel opening choked with weeds and other growth. It looked like a scene from an old Tarzan movie. The gate was unlocked with only minor trouble and we started descending down into a black abyss. We were immediately hit with a terrible smell and noted, in our flashlight beams, mold and other growth on the walls.

But, there it was, looking as if the staff just gotten up and walked away, leaving desks still in place and typewriters ready to clack away. There were offices, meeting rooms, cafeterias, bunk rooms, decontamination areas and other facilities making up a self-contained living area in case "the bomb" was dropped. One of the people in the party reached over and flipped a wall switch and, much to our amazement, the lights came on! This after twenty plus years of abandonment! I wonder who's paying that bill?

Our quest for the TMC equipment was in vain, as we learned it was long gone. We did get a nice Model 28 TTY printer/perforator and some Motorola VHF/UHF FM equipment well representing the era, so not all was lost. We turned off the

lights, locked the gate and said good bye to our great adventure.

Continuing with conference news, I want to congratulate all of the Contest winners on their wonderful entries. I'm always in awe of what wonderful artifacts and collections people come up with. This is also the time when folks are most generous with their donations to the Museum. See the donor list elsewhere in this issue.

I must thank the award committees for selecting me to receive the Houck Award for preservation as well as the Taylor Award for work in the field of television. I am deeply humbled and honored.

A shadow was cast over all the recent good news and happenings at the Museum this period by the passing of the Museum Registrar, board member and Secretary, Robert Perry, W2TIX. Bob was a very dedicated and hard-working volunteer and a good friend. He is missed.

This summer the Museum library had the help of a professional librarian from the NYS School system. On summer vacation from his school duties, Don Patk, KC2KJH, joined us on our Tuesday work sessions to set up our cataloging system and to teach us how to use the Library of Congress Web site and other resources to determine how to

RECENT MUSEUM DONORS

- ❖ State of New YorkTechnical Material Corp Communication System
- ❖ Albert Nystrom Estate ..7 Crosley battery sets, much more
- ❖ Robert Frost.....A-K components, Heath Test equipment
- ❖ David Stewart K2ZCD ..Viking Valiant, BTI-2000, Hallicrafters SX-71
- ❖ Robert Hodge.....Scott RBO, AK-35, collection of SONY video
- ❖ Tim GaliMIL RAL-5 RX, Vacuum tubes
- ❖ Irv Walters.....Collins 242-9C Aircraft transmitter
- ❖ Richard Fish W2OWF...Meissner SS, ARC-5s, more
- ❖ Leatrice KempHB battery sets, RCA & Telefunken tube Specs
- ❖ Bill BurlinghamRCA 9-T-270 B&W TV
- ❖ NYS Civil Defense.....Motorola VHF/UHF FM Mobile units
- ❖ Willard Donlay.....Large Qnty Magnavox transistor radios, SONY micro TV
- ❖ Tom Rosica W2GIRLes Logan Bug, Brass keys, McElroy code oscillator
- ❖ David YouseKleinschmidt TTY equipment and spares
- ❖ Ralph Harris.....Hallicrafters S-38E, Western Electric BHL receiver
- ❖ Tony Prasil.....General Radio 716C capacitance bridge
- ❖ John Casale W2NIAN/GSC-T1 Code training system by McElroy
- ❖ Fred CrewsBook, German, 1916 Wireless telegraphy, J. Zenneck
- ❖ George GoldstoneHP-330B distortion Analyzer
- ❖ Joel EkstromBook, "Five Years at the (MIT) Radiation Lab"
- ❖ Jack Wenrich.....Huge collection, over 275 line items, over 3000 radios, books, parts, audio equip., more

Cash Gifts

- ❖ Randy Haus
- ❖ J. Coles, Jr. (In memory of Bob Perry)

identify each book. Don further taught members the basics on book restoration and preservation and what materials to use and not use. In return, Don got enough 365 pF variables out of the junk box to pursue his love of building and-DX'ing with crystal sets.

While all of this was going on your crew was really busy, with many extra days of overtime, bringing in the largest single collection ever given to the Museum. It was donated by our friend Jack Wenrich, K2RW, past AWA Board member and retired Museum Registrar, who moved into a modest-sized retirement home.

Despite the fact that our Deputy Director, Allan Pellnat, KX2H, has moved to North Carolina, he remains active with the Museum. One of the many tasks he continues is the administration of the successful "Adopt-a-Radio" program. This year we had three radios adopted and look forward to their return next year.

Please look towards the back of this issue for the announcement of the now-available 2004, *AWA Review 17*. This year there is a new editor, Brian Belanger. Brian came up with a dandy se-

lection of articles and original research papers that will delight all.

While you're looking at the ordering details, note also that there has been a price reduction on many previous products. It's not too early to order for the holidays.

Also check the video loan information in AWA News. There you will see that the Charles Herrold Story, thanks to a kind gift by Mike Adams, is now available for loan on DVD as well as VHS. Finally, mark your calendars now...yes, it's not too soon...for the AWA Museum's Spring Meet on Saturday, May 7, 2005. Moving the Spring Meet into the Bloomfield High School and expanding its format was a huge success last year and will be followed again. Just an administrative note: if you have me bookmarked, please change my e-mail address to: egable@rochester.rr.com. S'long from your Museum crew.

Ed Gable

Ed Gable k2mp/w2an
Museum Curator

LETTERS, continued from page 6

old socket contacts can develop significant resistance. I monitored the "B" supply with both a voltmeter and an ammeter.

Now it was near sunset, when I should begin to hear some good broadcast band DX. I pulled out the tickler knob to increase feedback and the Pup came to life with a squeal. Slowly I pushed in the ticker knob to stop the oscillation, and WGN Chicago came blasting into the "baldies." With the tickler set just below the oscillation point, turning the book condenser lead screw brought in one station after another with what seemed to be selectivity equivalent to that of a cheap AC/DC table radio having three or four tuned circuits at 455 KC.

Using a signal generator, I determined that the Pup's tuning range was about 575 KC to 1850 KC. It might have originally been lower, but warpage of the "molded mud" book condenser plates could have reduced the maximum capacity.


I called Dave Kraeuter on the telephone and let him listen to the Pup by holding one of the headset receivers to the transmitter. With the lead screw all the way out (book condenser open) 160-meter amateur SSB signals could easily be heard. If you've not heard SSB on a regenerative receiver, you're in for a good surprise. The characteristics of a regen are ideal for SSB reception.

During a later telephone conversation, Mr.

Kraeuter related that he had taken his Crosley Pup to the local college physics lab, along with a similar Pup belonging to a friend. Both Pups performed well in the lab, with smooth regeneration, bringing in numerous broadcast signals. However, back at his home, neither Pup would regenerate properly. Only one local station could be received with virtually no selectivity.

Based on our conversation, I suspect that the reason both Pups failed to perform at Dave's home might be overload from the local broadcast station. His 75 foot aerial no doubt put a strong enough signal from this local station into the grid circuit that the rectified grid current biased the tube to a point where its amplification was insufficient to support regeneration. I suggested trying a shorter aerial, perhaps only a few feet long. With NO aerial connected, the Pup should regenerate and go into oscillation.

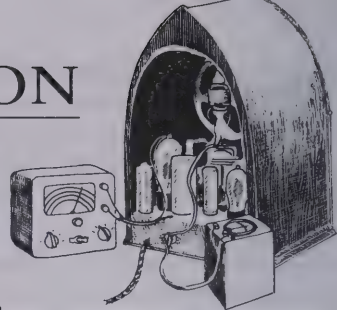
T. TURNER, K8VBL/VP2VEL
Watervliet, MI

T. Turner's long letter contained much more fascinating detail on Pup construction and regenerative set operation than I could include in this column. Perhaps we can convince him to send us a full-fledged article on the design, construction and operation of small Crosley regenerative receivers. What say, Mr. Turner? 

EQUIPMENT RESTORATION

EDITED BY **KEN OWENS**, 478 SYCAMORE DR., CIRCLEVILLE, OH 43113
radiowd11@yahoo.com

PLEASE SEND CORRESPONDENCE DIRECTLY TO THE ABOVE ADDRESS,
INCLUDING SASE FOR REPLY.



Troubleshooting a Sparton “Tough Dog” and “A Cautionary Tale”

The following contributions are from John Kaetz (Bessemer, AL).

During the repair of a 1948 AM/FM Sparton with record player, I found that the set had poor sensitivity on both AM and FM. The secondary of the AM IF transformer would not tune. This set used slug-tuned coils with fixed capacitors of the type consisting of silver layers on both sides of a mica sheet. One side was the common plate. The sheet was held by clamps formed by terminal extensions.

This construction was new at the time, and no one knew how troublesome it would become in the future. The silver migrates along the mica to form conductive paths. This condition can cause noise or loss of signal due to leakage between primary and secondary of the transformer. Also, the clamping pressure can decrease with time and metal fatigue leading to noise and instability.

I opened the AM IF can, but there were no capacitors in it. Turns out they were in the FM IF can. I cut the common connection and replaced with silver mica capacitors. Although the IF now aligned, the problem was still there. After much thought, I realized that cutting the common connection merely placed the capacitors in series, and the noise and leakage were still there. I then cut all connections to the mica sheet, and the problem was solved.

Having solved that problem, I turned to another. Occasionally while connecting the antenna, the AM function would “block.” When this happened, a positive voltage of about $\frac{2}{3}$ of the screen (G3) voltage would appear on the signal grid (G1) of the 6BE6 converter. The circuit is simple: the signal is coupled to G1 through a 250 pF capacitor, and G1 is returned to the AVC line through a 2.2 M Ω resistor. G3 is fed from a 125V supply through a 1 k Ω decoupling resistor giving about 120V on the screen.

The tube could be unblocked by momentarily grounding G1. A random noise pulse would also unblock or block the tube depending on its state at the time. The tube would block if G1 was momentarily “flashed” with screen voltage. Thus, I

could go back and forth at will.

I tried several replacement tubes and even replaced the socket thinking it might be leaky, but nothing helped. Noting that the G3 voltage exceeded the maximum rating by about 20V, I lowered it to 90V by changing the decoupling resistor from 1 k Ω to 27 k Ω . I also lowered the grid return resistor from 2.2 M Ω to 100 k Ω .

Here are some observations which might lead to an explanation. With 120V on G3, “flashing” G1 would block the tube and about 70V would appear on G1 and stay there. With 90V on G3, “flashing” G1 would cause blocking and 60V would appear on G1. The voltage would gradually leak off, snapping back to normal operation when down to about 50V. When the grid return resistor was lowered to 100 k Ω , blocking could not be induced.

If anyone has a theory about what’s going on, let us know. At any rate, the set is working fine with these changes.

.....

Here is a cautionary tale. Awhile back, I acquired a late 1940s Gilfillan radio. It was in poor condition, but I didn’t have a West Coast set in my collection and figured I could restore it. I removed the knobs and plastic dial escutcheon and put them in warm soapy water to soak off the dirt. This is my normal procedure which has worked well with all kinds of plastic parts [*Me, too. Ed.*].

About an hour later, after getting the radio to play, I checked on the parts. To my dismay, I found 2 slimy globs which used to be knobs and an unrecognizable mass that was the escutcheon. Since the cabinet was in poor shape and new knobs and an escutcheon would be virtually impossible to find, I put the set in the junk box.

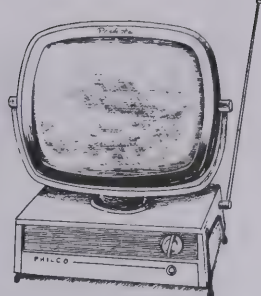
Just because a method has always worked in the past, don’t assume it will always work in the future. Try before you commit.

[*I can’t imagine what kind of plastic these parts were made of. Ed.*]



TELEVISION

EDITED BY **RICHARD BREWSTER**, 145 LITTLE PECONIC BAY ROAD,
CUTCHOGUE, NY 11935 PLEASE INCLUDE SASE FOR REPLY.



The Original Television Girl

We are here in Dundee, Scotland preparing for the arrival of our sometimes home, the M/V Anastasis. Isn't e-mail great? Conveniently, I recently visited a TV collector near Edinburgh, whom I expect will be the subject of a future column—RB.

The TV column in the July issue of *The OTB* explained how CBS began TV broadcasting back in 1931. A photograph of Natalie Towers was shown in front of the mechanical camera. A bit of sleuthing resulted in my locating the ninety-six year-old star herself, alive and well and living in New York City! In fact, some weeks ago, I was privileged to have a long phone interview with her. She subsequently sent along lots of historic news clippings.

Natalie was able to set the record straight and provide some interesting information about her career. One thing was made quite clear: she did not approve of the photo I used. In fact, she said, "Mr. Brewster, I was so appreciative of [your ar-



Natalie about to be televised in \$660,000 worth of jewels as a CBS publicity stunt.

ticle], even though it included that terrible, terrible picture of me ... when I think of the readers of the Antique Wireless Association, what must they think? How could anyone who looked like that have been named 'The Television Girl'?"

Natalie kindly sent along this photo in which she is shown wearing \$660,000 worth of jewels for a publicity stunt in front of the W2XAB (WCBS) TV camera. CBS, in a spot news release, claimed that this was done "merely to test the possibilities of television in bringing interesting and unusual events into the home." The November 1st issue of *The American Weekly* reported that ten policemen guarded her during that broadcast!

How did Natalie Towers get her start? She was eagerly seeking a job in the theater, but with no success, so one day she went over to CBS and managed to get a radio audition. The next day she got a phone call and a man who introduced himself as the head of publicity at CBS said, "Is this Natalie Towers? Are you seated?" Then he went on, "We have named you 'The Original Television Girl'."

Well, Natalie told him that she had never heard of this television thing and did not give the impression that she was excited or grateful. Nevertheless the caller continued to explain that not only was "television the thing of the future" but that, "within one year television will have eclipsed the movies and the stage."

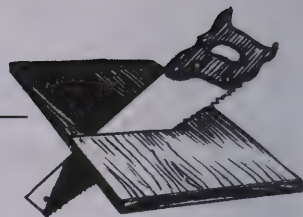
Meanwhile Natalie's father, who had wanted her to become a doctor, was terribly disappointed at her desire to go into the theater. She explained, "[The theater] at that time was something not nice at all! So when he heard about 'this radio and television,' this was something at least respectable."

When she went over to CBS after the phone call, they met her and asked, "Well, what are you going to do?" She had done some singing in college, and after a vocal audition she was told, "You know that your voice comes over very, very nicely!"

Natalie related, "They told me I was going to have this show, that's called 'The Natalie
(continued on page 19)

BREADBOARDING

EDITED BY **DICK PARKS**, 2620 LAKE RIDGE CT., OAKTON, VA 22124
E-MAIL: rparks9@cox.net. PLEASE INCLUDE SASE FOR REPLY.



*Bring Historical Circuits to Life
On Your Workbench!*

A Three-Audion Breadboard Receiver

— Conclusion —

In the May 2004 column, we looked at the start of a regenerative receiver breadboard using three Czech reproduction Audions. The project began with construction of the detector and RF amplifier stages. After testing these two stages using a plug-in coil for the broadcast band, I decided to use a small variable capacitor to couple the RF signal into the detector and to remove the “throttle capacitor” used as a regeneration control. My guess is that capacitor had severely worn bearings, accounting for its poor control characteristics. After adding an audio stage, the circuit now looks like Figure 1.

Circuit Changes

Beside the changed RF coupling, the detector coil now has lost its primary winding. There’s an RF choke across the antenna input rather than a variable resistor. The detected audio developed across the high-inductance choke (600 Henrys) is sent to a 270 K grid resistor whose cold end goes to a potentiometer fed from a binding post for the “C” bias to the final audio tube.

These repro tubes each take 700 milliamps of filament current at 4 volts. I built a power supply to provide A, B, and C voltages. It can be seen to the left of the radio in the front view. The radio’s front panel is made of heavy two-sided copperclad. I sprayed it with black crackle after all the drilling and hacking were done.

Notice the three round brass screens (from Antique Electronics Supply) on the panel. They are for viewing the filaments, which can be seen

burning brightly behind them. Also on the panel are the antenna and ground binding posts, r.f. coupling control, main tuning, regen control, filament voltmeter, audio gain control, and binding posts for ‘phones.

Looking at the interior view of the receiver, you can see that all the parts are securely mounted on the piece of dense 3/4-inch composition board. The big choke is the can next to the tuning coil, and there is a row of binding posts for power connections. Most of the wiring is underneath, with bypass caps and a couple of resistors recessed in circular cutouts made with a hole saw. The panel voltmeter has a paper scale I made and glued over the stock scale—it shows 4 volts right in the middle of the scale.

The tuning capacitor is a two-gang National part with 400 pF total capacitance, and having

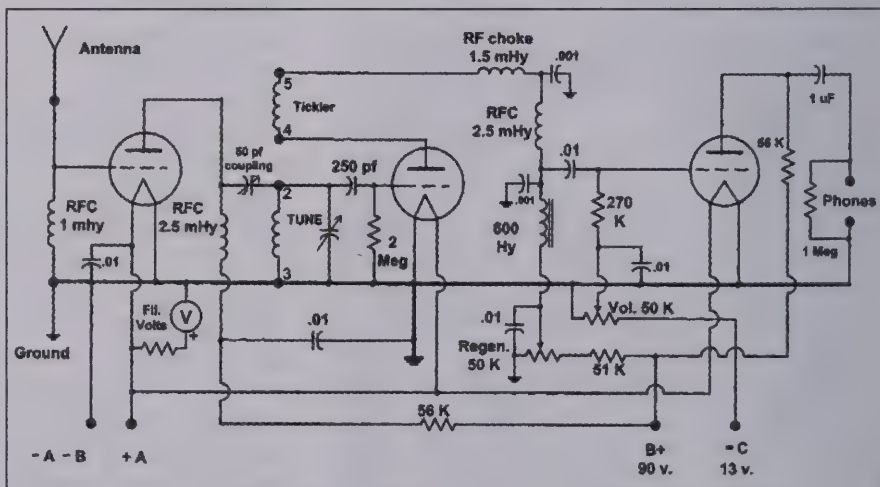
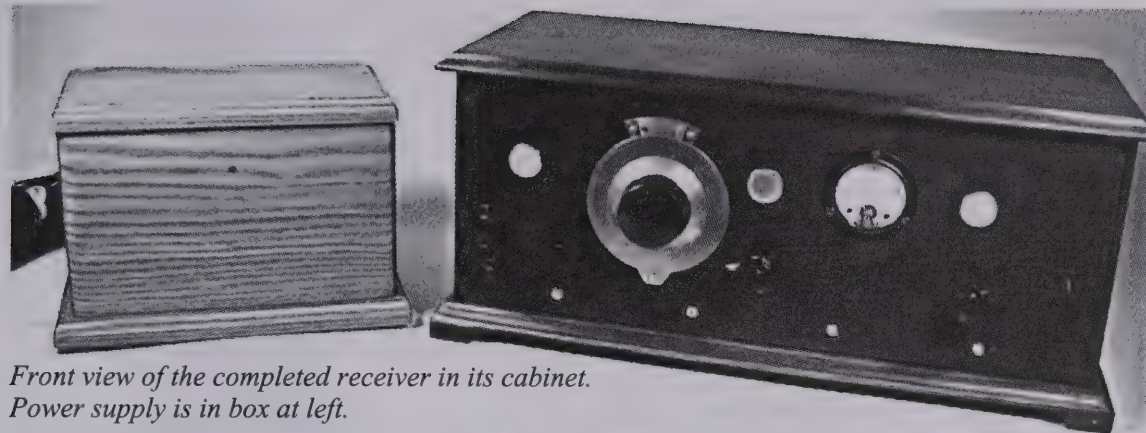


Figure 1. Final schematic of the three-Audion receiver.

270 degrees full-scale rotation. Ebay provided a cool National vernier dial numbered from 0 to 200—so that 150 divisions represent 270 degrees. The regeneration control potentiometer can be set to apply up to +40 volts to the detector plate. My BC band coil tunes from 450 to 1790 kHz, and I made a SW coil to tune from about 6000 to beyond 14000 kHz.

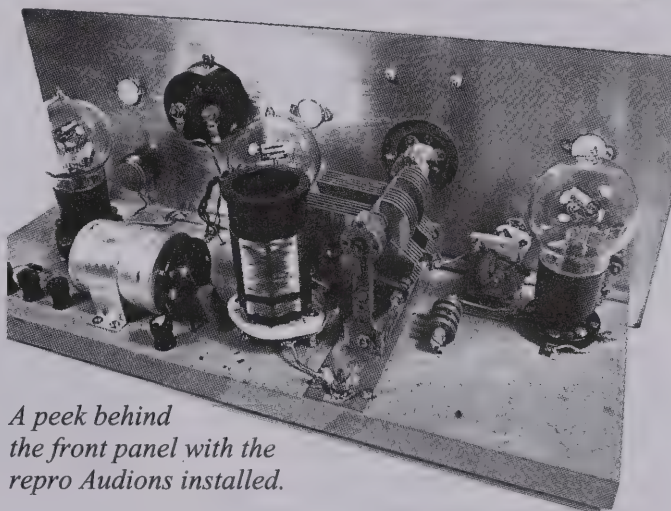


Front view of the completed receiver in its cabinet. Power supply is in box at left.

The Results

In the previous column, I mentioned testing with '30 tubes; then came a gift in the mail from Phil Taylor of West Sussex, England. He sent me a pair of high-gain Osram HL2K triodes made in the 1930s! Not only did he supply complete data sheets, he rebased the tubes so I could just plug them into the breadboard. So now I have four different sets of tubes with which to check this set: the repros, Phil's HL2s, my '30 triodes, and a pair of Mil-spec 864s.

I set up the receiver for sensitivity tests at 1000 kHz and at 10000 kHz. Using my signal generator as a source, I measuring the input signal required to supply a good strong four volts of recovered audio across the 'phones. My input signal was a 400-Hz tone modulating a variable RF carrier to about 80%. The output stage remained a type '31, and I kept the B and C supplies steady at +90 and -22 volts.



A peek behind the front panel with the repro Audions installed.

teristics. The measured receiver sensitivities I got using the various tubes in the RF and detector positions are shown in Figure 3.

These numbers jibe pretty well with expected values; they follow the tube characteristics, for one thing. The repro tubes seem to suffer a comparative loss above the BC band, though. And

(continued on page 19)

Figure 2 shows the approximate tube charac-

	Fil Volts	Fil Amps	Ib @ +90 v,	Eg	Amp Factor
KR Repro Audions	4.0	0.7	1 mA	0	approx.12
Osram HL2K	2.0	0.1	1.25 mA	0	27
RCA 30	2.0	0.06	1.5mA	0	9.3
VT-24 (864)	1.1	0.25	3 mA.	-5	8.2

Figure 2.

Input signal required across 50 ohm input for 4 volts p-p audio output, dB below 1 volt rms		
	1000 KHz	10 MHz
KR "R" Repro Audions	-62	-37
Osram HL2K	-70	-56
RCA 30	-60	-49
VT-24 (RCA 864)	-50	-41

Figure 3.

RADIO REPRODUCERS

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The Ensco Speaker Kits

The year is 1928, the height of the radio craze. You've decided to purchase your first receiver. But the high price of the radio set (late battery powered or early AC) gives you sticker shock! On top of that, you have to buy a speaker, which was not included. The speaker is obviously an essential component, but its price might well be more than your full week's pay. Since you are a handy guy, you decide to save a bundle by building your speaker from a kit.

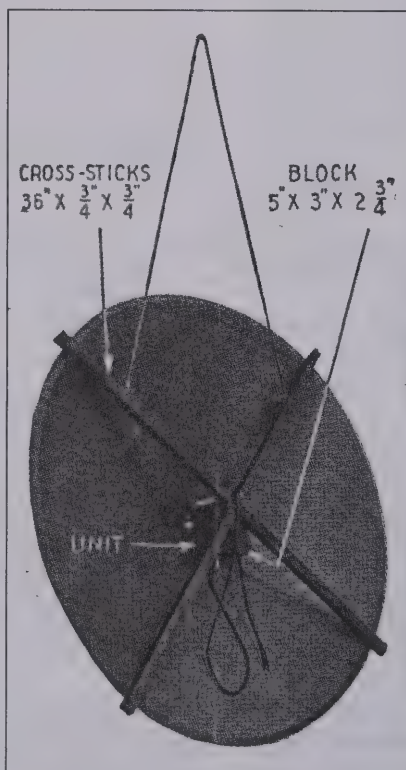
One supplier of speaker kits, was the Engineer's Service Company, better known as "Ensco." Headquartered in San Francisco, the company had distributors in New York, Boston, Chicago and Toronto and also sold by mail order. The speaker design was of the popular paper cone type, a design which had replaced the now-obsolete horn speaker.

The Ensco kit included everything you would need: reproducer, glue, wood braces, wire and a huge sheet of "Phonotex," which was the material for the paper cone. The only tools required were a common scissors, a screwdriver and a pair of pliers. You began by simply cutting out the round cone and pie-shaped gap, all clearly marked. Following the rest of the instructions, you completed the assembly in less than an hour as promised in the advertising.

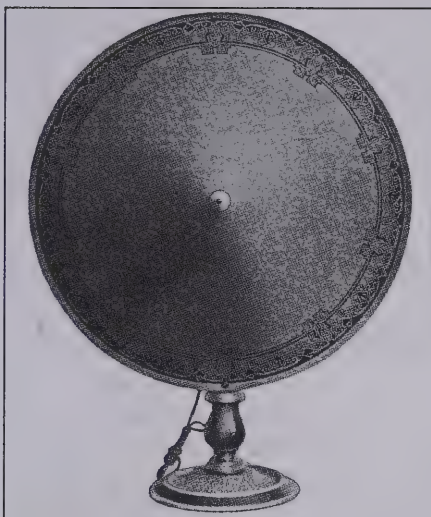
Ensco claimed that good tone and absence of mechanical noise depended on size, and the company offered the biggest cone speakers of the time. You could choose between a 24" or 36" cone configured as a



This 1928 purchaser apparently couldn't wait until he changed out of his business suit before beginning on his kit.



Above: Front view of completed wall-mount speaker. The unit was available in 24- or 36-inch sizes. Left: Rear view of wall-mount kit shows construction details.



A completed Ensco pedestal cone speaker.

wall-mount unit or console type. The popular pedestal (table) mount was available only in the 24" size. The front of the paper cone was decorated with a handsomely engraved, Greek-style motif around its perimeter. The wall-mount kit sold for \$10; the table kit, with its turned, wooden pedestal, sold for \$13.50.

The fully fabricated Ensco speaker worked well with any amplified radio set running with a voltage range of 90 to 250 volts. The manufacturer recommended sets using 201-A or 210 output tubes. Tonal quality could be altered by a screw adjustment of the magnetic air gap.

Ensco boasted that the attractive design of the completed pedestal speakers would "Make any woman glad to have one in her living room." The jury is still out on that one! ☐

TELEVISION, continued from page 15

Towers Show' three times a week! But they didn't do any writing for me, Mr. Brewster, they just said, 'It's my show'." She had to devise everything that she would do on the air. "...this I did not like; it was hard! I mean when I was performing I liked it all right, but I had to plan it three times a week ... practicing and all that. For me it wasn't terribly enjoyable."

As was noted in the July column, the initial broadcast was made on the 17th of July 1931. New York Mayor Jimmy Walker raised a curtain and introduced Natalie Towers, described by the *Herald Tribune* as 'the perfect radio vision type.' Actors and singers such as Ed Wynn and Kate Smith were also featured on that telecast.

When I asked Natalie to tell me what it was like in front of the TV camera and wondered if they had the room lights off, she said, "Yes, yes, they did and I did this dance, a dance step on a high platform, I remember that I got hurt and it was dark. Once in a while CBS would come up with a little script for me that I was very grateful to play, and I would do that."

In the June, 1931 issue of *What's On The Air—The Magazine For The Radio Listener*, an article entitled, "Television Peeps Around the Corner," revealed that NBC, not to be outdone, had selected its own Dorothy Knapp as its own "television girl." But Natalie Towers will forever be "The Original Television Girl!" ☐

BREADBOARDING, continued from page 17

the Osrams are good hot triodes—the receiver is working with them at a microvolt or less, if my readings are right. I did not make any tests to differentiate between the RF and detector stages using different tubes, nor did I try to select out the hotter tube of each pair to get better readings.

In use, the receiver operates smoothly at all frequencies. I find the RF coupling control can be advanced at the lower end of the tuning range, implying the advantage of using an RF stage as something of an impedance matcher between antenna and regenerating tank circuit. In the BC band, there's a strong local at 1380 kHz that I can block with a parallel trap in the antenna lead. If I

ever build another of these receivers, I'll add a tunable trap control to the front panel. But first I need to find another one of those fine National variables and a 270 degree dial...

ACKNOWLEDGEMENTS

My sincere thanks to Phil Taylor for those hot little Osram triodes. And thanks to Eunice Kron of KR Tubes in Prague, Czech Republic, for sending along new tubes to replace a few that I couldn't get to emit. The KR folks treated me right. ☐



Radio Navigation Systems, VLF through MF

Part 2 (Conclusion) — Practical Navigation Systems

Time-Difference Systems

Let's use the principles discussed so far to demonstrate how a "time-difference" Loran navigation system works. First, when we discussed the hyperbola, we used the words "length" and "distance" interchangeably. Since the velocity (speed) of propagation is constant, then the time to traverse a particular distance is simply that distance divided by velocity. In other words, propagation time is directly proportional to the path length (distance.) For radio waves following the curvature of the earth, if the wave's speed is ~186300 statute miles per second, then the time to travel 186 miles is one millisecond (1000 microseconds) and the time to travel 372 miles about 2 milliseconds (2000 microseconds).

Suppose we have a LF transmitter transmit precisely timed and coded bursts of r.f. We'll call this station the "master" station. The r.f. bursts are received by a "slave" station located some distance from the "master" station. The "slave" then transmits a burst of r.f. that is also precisely timed and coded. For now, let's say master and slave transmit on the same frequency.

Let's now say we have a LF receiver with an oscilloscope and "decoding" device connected to its output. The decoding device looks for the specific code burst signatures of the master and slave. When the signature from the master is found, it triggers (starts) the oscilloscope's precisely timed horizontal sweep. When the slave's signal, is received, it appears on the horizontal base as a "pip." The difference in propagation time between master and slave stations is measured from the start of the trace to the leading edge of the slave's "pip." Knowing this time puts us on a hyperbolic "line of position," abbreviated LOP. Repeat this process using another set of master/slave pair stations, and we get another time, which puts us on another LOP.

If the LOP's for each particular LF master/slave pair are plotted on transparent paper and the papers are overlaid on the same scale navigation map, the intersection of the two particular LOP's we measured locate our position on the

navigation chart. That's it in a nutshell!

Another approach is to use one Loran master/slave pair to identify a LOP, then use one or more LF beacons to "triangulate" the position. The angles measured to the beacon(s) will intersect the LOP and identify our actual location. The use of beacons with a single Loran fix is not as accurate as a Loran fix using only Loran transmissions. The primary reason is that the use of beacon fixes over a long range is fraught with inaccuracies due to propagation variations over long distances, e.g., skywave.

Figure 5 illustrates a Loran A navigation chart with LOPs for the 1950 kHz master/slave pair that was once located at Nantucket and Bodie Islands. (The MF band navigation system Loran A has long been decommissioned in North America and other areas of the world).

Each line represents a time difference between receipt of a master and slave signal. If, for example we were to measure a time difference of 4200 microseconds, we would be located someplace on a relatively "flat" LOP that seems to bisect the line interconnecting Nantucket and Bodie Islands. If we had a chart for another received Loran A station pair, and overlaid that chart on the first chart, the intersection of the two different LOPs would indicate our position.

There are a few points to be made about this system. First are the obvious system requirements:

1. Timing and frequency control accuracy, both for the master/slave pair transmitters and the user's receiver.
2. Up-to-date charts and information about navigation system outages and route hazards.
3. A working backup system, such as anti-collision radar.
4. The operator's understanding of the skywave issue. Notice the fine print on Figure 5 regarding skywaves and ground waves? Skywaves represent a path length that is longer than the ground wave and are also unpredictable because the propagation path length is always varying.

The not-so-obvious points are:

5. The LOP midway between the master and

systems, comparing the phase of the master and slave signals forms the hyperbolic grid pattern. Phase? What does phase have to do with propagation distance and time?

Let's say you receive two different stations transmitting on the same frequency. However each station takes its turn transmitting on that frequency. Basically, you use the first station as the master, and your receiver's electronics "locks" to that station. When the second transmitter's emissions are received, the phase of the received signal is different than that of the first station.

What we are saying is that a common point on both received station's signals does not occur at the same time. There are 360° per cycle of r.f. If we use the 10.2 kHz Omega transmission, each cycle takes about 98 microseconds to complete the 360° cycle. For each 98 microseconds, the RF wave advances about 18.3 statute miles, or about 16 nautical miles. If one station's 10.2 kHz signal path length is 4 nautical miles longer than the other station's 10.2 kHz path length, there will be a 90° phase difference between the two received signals.

One must continuously keep track of the total phase change between two different Omega stations to be able to locate oneself on the correct LOP! Thus, we have to know our position at the start of the voyage, Loran-C, LF beacon fixes, or even the centuries old “shoot the sun or stars” fixes are usually accurate enough for this purpose.

1. Almost worldwide coverage. (Loran C does not cover South America, Northern Canada, and Australia; Decca covered parts of NE United States, Western Europe, South Africa, Japan and parts of Pakistan and Bangladesh; Consol covered parts of Western Europe.

2. Omega base lines were typically in the order of 6000 miles, thus hyperbolic grid lines diverged far less than they do for Loran C.

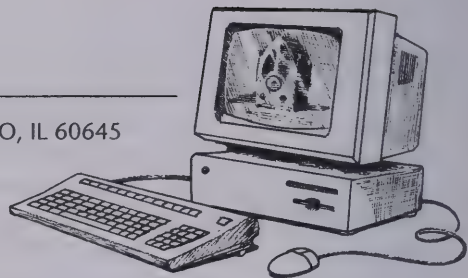
3. The Omega emission was a time sequenced (commutated)
(continued on page 23)



ON THE INTERNET

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Discussion Groups and Forums On the Internet

As has been previously discussed in this column, there are many online venues for gathering information about antique radios and wireless communication. Included are the large number of Web sites that offer discussions, message boards and forums. Early in the Internet's history, such sites were (and some still are) called bulletin board systems—or BBSs for short. These were simply electronic versions of the ever-present physical cork bulletin boards hung in shops and institutions for community use. Post your wants or messages and check back for replies.

Many hobbyists and radio enthusiasts now use much more sophisticated Web-based programs to provide online meeting places for exchanging information and ideas and just “hanging out.” These new programs offer many more options for the use, including icons, picture embedding or uploading, want ads, links to services and vendors and much more.

Listed below some of the most popular radio-related such sites that I've come across. They encompass a wide range of topics and interests that will appeal to newcomers and old timers alike.

Obviously, I have to mention the following two “home” message board sites:

The Antique Wireless Association Message Board

<http://www.antiquewireless.org>

The Antique Wireless Association offers this service to collectors, historians and restorers, AWA members or not. Feel free to post any questions concerning radio history, radio identification or restoration. All are welcome.



Antique Wireless Association – Yahoo! Groups
<http://finance.groups.yahoo.com/group/antiquewirelessassociation>

This group was created by, and is run, by the AWA's Carolina Chapter President, Ron Lawrence. This site is for anyone interested in collecting and/or preserving the history of electronic communications gear—spark, telegraph,

early tube radios, military, commercial, broadcast and transistor sets.

Antique Radio Collectors – Yahoo! Groups

<http://groups.yahoo.com/group/antique-radio/>

This is another group, hosted by Yahoo! You'll find discussions regarding finding, collecting, buying and restoring early radios. Hosts a weekly chat session on Wednesdays at 8 p.m. central time. Large database of files, photos and links.

AntiqueRadioForum

The Antique Radio Forum

<http://www.antiqueradios.com>

Alan Voorhees has done an outstanding job creating and upgrading this premier site for all collecting interests. The site boasts eleven different Forum Sections—antique radio, antique TV, transistor, test equipment and more. The site also has a classified resource link section, a photo gallery, archives and a weekly Chat session.

Radiomuseum Radio-Forum for Radio Collectors

<http://www.radiomuseum.org>

This European based forum deals with restoration and repair. There are messages and discussions in many languages—German, English, French, Spanish and Italian. Just click on the country flags for your language. Topic sections include valves/tubes, restoration, manufacturer's histories, periodicals, test equipment, among others.

Radio Swap Meet

<http://www.radioswapmeet.com>

This antique and vintage electronics resource site run by Dan Collins has a wide range of offerings—buy/sell, chat, forum, radio data, restoration articles, vacuum tube exchange, tube data and



a “wish list” section. You can also search for a radio with the “Radio Find” feature.

The Radio Attic

<http://www.radioattic.com>

Steve Adam's great site boasts a very large archive of radio pictures for identification purposes, restoration articles and want ads. Forum sections include "Announcements," "Radios Wanted," "Repair Forum," "Cabinet Restoration" and more.

the Radio Attic

Find your old
radios here!



Rap 'n Tap Discussion Group

<http://www.midnightscience.com/rapntap>

This site hosts a lively group dedicated to crystal radios exclusively. This group also has a large archive of previous messages and topics to browse through. Hosted by The Xtal Set Society, this site also offers info, parts and supplies for the budding radio builder and experienced "Rock Hounds."

Nostalgia Air

[http://www.](http://www.nostalgiaair.org)

[nostalgiaair.org](http://www.nostalgiaair.org)

Rich Lancaster has put together a great site with a technical discussion forum, an outstanding Reference section, an online tube base identifier and improved Riders schematics, just to name a few features. As of this writing, Hurricane Frances recently



swept though the Rich's Florida East location. So Rich has removed the computer equipment to safer ground and the site is temporarily down.

Internet Newsgroups

Newsgroups can be accessed via the news-reader feature of your favorite browser or by linking via your Internet service provider. Newsgroups have been around almost since the inception of the web and are the granddaddy of the Web-based BBS-type message boards. For complete background on newsgroups and more specific suggestions about how to connect with them, please see my column in the May, 2000 issue (Vol 41, No. 2).

Following are some of the currently active and popular newsgroups in our areas of interest. They represent just a few of the radio and amateur related newsgroups available under the "rec.radio" hierarchy of the Internet Newsgroup structure.

rec.antiques.radio+phono

Discussions of antique radio and phono equipment

rec.radio.amateur.boatanchors

Vacuum tube-based amateur radio equipment.

rec.radio.amateur.equipment

All about production amateur radio hardware.

rec.radio.shortwave

Shortwave radio enthusiasts.



BELOW 535, continued from page 21

pattern (see Table 2—Part 1).

4. Propagation corrections to account for day/night and seasonal effects could reliably be done at Omega's very low frequencies. Attempts

to develop propagation corrections at LF and MF have proven to be unreliable.

Conclusion

Needless to say, this article can only serve as a very basic introduction to the VLF and LF navigation systems that were commonly deployed around the world. Interested readers are encouraged to refer to the references given in Part 1, the web site put together by Jerry Proc, VE3FAB (<http://webhome.idirect.com/~jproc/hyperbolic/index.html>) and other (mainly historic) sources for a more thorough explanation of these systems.

In all probability, the days of the remaining LF beacons and hyperbolic navigation systems are limited. There seems to be no doubt that satellite navigation systems, interfaced with dedicated PC systems, have provided superior accuracy at far less initial user investment cost. They have also made the process of navigation so much less technical that the position of "navigator" is virtually redundant.



Measurement	Value	Unit
velocity of light	299.793×10^6	kilometers/second
	186300	statute miles/second
	0.18630	statute miles/microsecond
	299.793	meters/microsecond
knot	1.1508	statute miles per hour
nautical mile	1.1508	statute miles
statute league	3	statute miles
	4.828	kilometers
nautical league	3	nautical miles
	5.5597	kilometers
statute mile	0.86896	nautical miles
	1.60935	kilometers

Table 3. Useful constants and equivalents.

THE 2004 ANNUAL CONFERENCE ONE MAN'S IMPRESSIONS

Photos by the author.

I love the lectures and contest at the annual AWA meet, but what I enjoy most is the flea market, with its opportunities to pick up artifacts and—equally important—to socialize with the many friends I have made over the years. The flea market seemed to be a little smaller than last year but there was just as much opportunity to make interesting finds!

In Ed Bell's trunk alone I saw a mint GE doll (asking price \$1,300), the larger Bonzo Crosley dog in average condition (\$500), and an Oro-Tone sea shell horn speaker from the Muchow collection (\$1,700). Ed also had an AK 12 bread-board (VGC), a RADAK receiver, a Zenith IR with the amplifier, and a Federal 59. All good stuff.

Among the offerings of other sellers were a Sparton blue sled radio (\$2,600), a Crosley Pup (\$350), a Radiola I (\$2,000), a Colonial Globe radio (\$1,350) and a VG Kennedy 220 with 525 amplifier (\$2,000). The prices may seem high, but this is top of the line stuff and negotiable. Some good things didn't sell. I saw a VGC Federal 59 being packed back into the seller's trunk. No one would pay his reasonable \$900 price.

On my first round I try not to socialize. I shop. It took an hour and I finally bought my first item at the last table. It was a Dictogrand horn speaker. I had traded one years ago for a WurliTzer three-knob TRF radio and then could not find a replacement at a reasonable price. Here I found it.

It took me 2½ hours for my second round, where I made my second purchase. It was an Eagle three-knob TRF from about 1925. I am a WurliTzer collector and that company began marketing the Eagle brand in 1927. I had been

looking for one to add to my collection and my mission was completed here. Late the second day (Thursday) I found a reasonably priced, very early three-tube home brew receiver. How early? It had three wooden variometers and three tubes.

I have also been looking for a very rare telegraph key. You may have seen my display of WWI aircraft radio equipment in last year's contest. I am missing the key for my SCR 65 spark transmitter. Tom Perera had one and got it out for me to look at. His price of \$1,000 was probably reasonable but, with his kind permission, I decided to just photograph it so that I could and use the photo with my display.



The Tuesday night crowds overflowed both the Museum (seen here) and the Museum Annex.

This year the member's mixer was enlarged to a two-hour affair (5 to 7 p.m. Tuesday) and there were lots of complimentary snacks. The food held out for the entire two-hour period. There were more tables and chairs and the event was more highly attended than last year.

I ate all of my meals at RIT for the five days I was at the meet and found the food very good and inexpensive. Best was the buffet breakfast with all you can eat sausage, bacon, home fries,

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eggs, sweet rolls, juices and coffee. Service was instant and the price just \$6.00. Dinners were also quite good and all were priced well under \$10.00.

About 60 people attended the AWA member's forum. President Geoff Bourne reported that AWA membership is about 3,200. That's down from a peak near 5,000 in the mid 1990s. John Terrey reported that Antique Radio Classified has had a similar drop. Solutions were discussed.

AWA will put membership applications in future mailings and ask members to encourage others to join. The possibility of moving this meet back to the weekend was mentioned. Someone also mentioned giving a five-day conference membership to new members for, say, \$5.00 instead of making them pay the present \$20.00. The \$20.00 dues all goes to publish the four OTBs received by the members, so at \$5 without the publication the AWA would have no loss.

However, since three-quarters of our members do not attend our activities and *The OTB* is their only connection with the club, *The OTB* should be our main attraction. We need a larger classified section with more sales of better items for members but this is only my opinion.

The new Museum building is being planned. It may be a Butler-type structure located by the Annex but this is not firm.

The number of lots in the auction was about one-third less this year even though each attendee is now allowed to place five items in the general auction instead of the previous three. However the total sales of about \$36,900 were higher than a year ago so the average item sold at a higher price. One real bargain was a Dumont TV seen to be playing well and selling for only \$10.00!

A full auction report will



Most flea market vendors were open and showing their wares in time for the 6:00 a.m. pre-dawn opening.

be found elsewhere in this issue, but the star of the show was a Sparton Bluebird, VGC for \$2,600. Other items that fetched high prices were a Kennedy #521 Amplifier (that's the small one), VGC, for \$1,000! A porcelain Uncle Tom crystal set said to be correctly configured brought \$700 and a red/yellow Addison RSA1 reached \$1,300. An AK 12 breadboard sold for \$1,150 and a 23-tube Scott Allwave said to be untouched and original went for \$1,600. A massive, primitive, United Kingdom 1914 very long wave Maritime receiver looking complete and in average condition went for \$1,150.

There was a radio with Federal tube sockets, but containing rheostats and other non-Federal parts and with a tag stating that it was made by C. D. Barnes for Federal in 1921. It was believed that it might be a Federal prototype. That one sold for \$1,500. I entered a nice working International Kadette with the cameo figures. It brought \$200 which I thought was about right. I also entered a nice 12-tube Scott tuner with good chrome and was disappointed with the sale price of \$80. This was

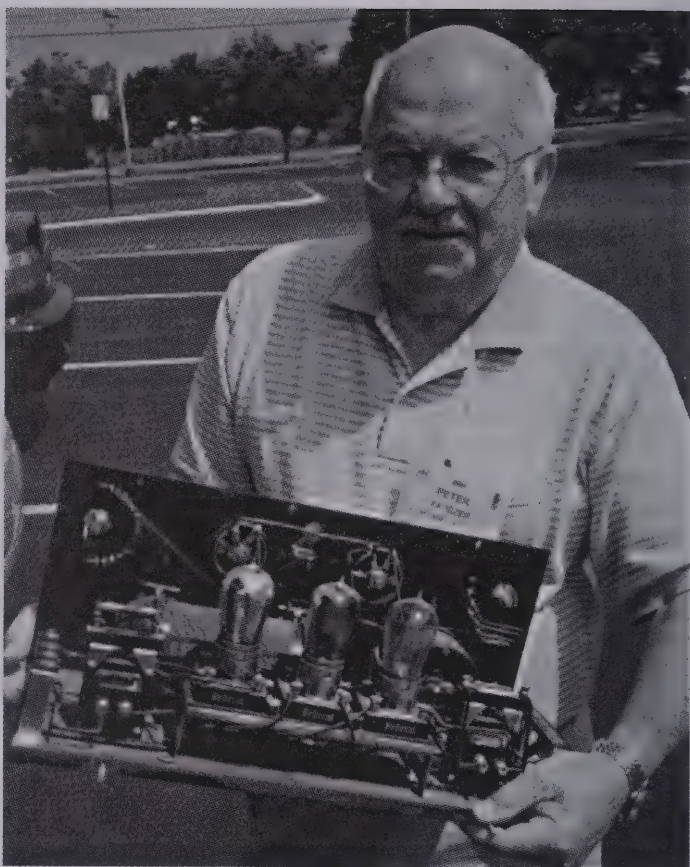


Auction lots receive intense scrutiny during one of the preview periods.

truly an international meet. One day I ate lunch with my good friend Alan Carter from England. I first met Alan when the AWA made its second trip to the UK. He has been to our meet each of the last 16 years. Also at our lunch table was Bengt Svensson from Sweden. Bengt helped me unravel a mystery. I have been looking for the telephone with a base matching the Federal Jr. crystal set. He told me that Federal bought out Ericson Telephone in 1914 and it is an Ericson telephone that I'm looking for.

Another time Franz Pichler joined me for lunch. He is from Austria, has been a member about 20 years and has been to the meet about six times. This year Franz gave a talk about the LRS relay tube, which was developed in Europe about the time of de Forest's work in this country. There were a total of 12 talks and I attended eight of them. All were excellent. The AWA Museum and Annex were both open Wednesday evening. I was probably the only person who saw both and made it to the Restoration Forum the same evening. The Annex is almost another museum with lots of artifacts displayed and not just stored. There are excellent displays of tubes, early TV keys, loose couplers and more. It was crowded with several bus loads of people as was the Museum.

The conference theme this year was "Broadcasting" and many of the contest entries reflected this. The Best of Show award went to the Ed



Peter Yanczer's possible Federal prototype set brought \$1,500.00 at the auction.

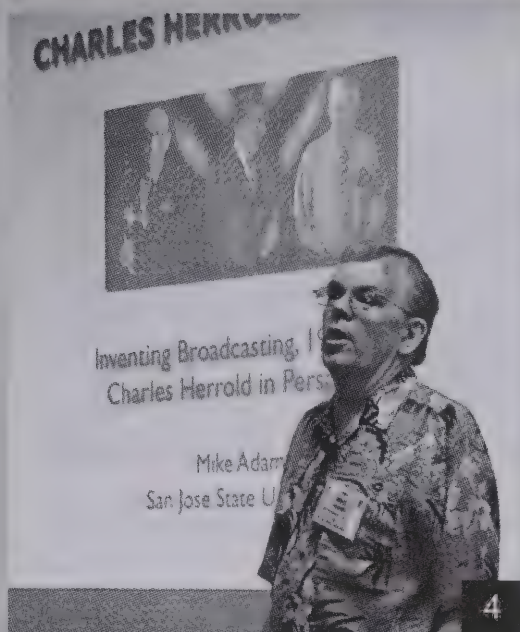
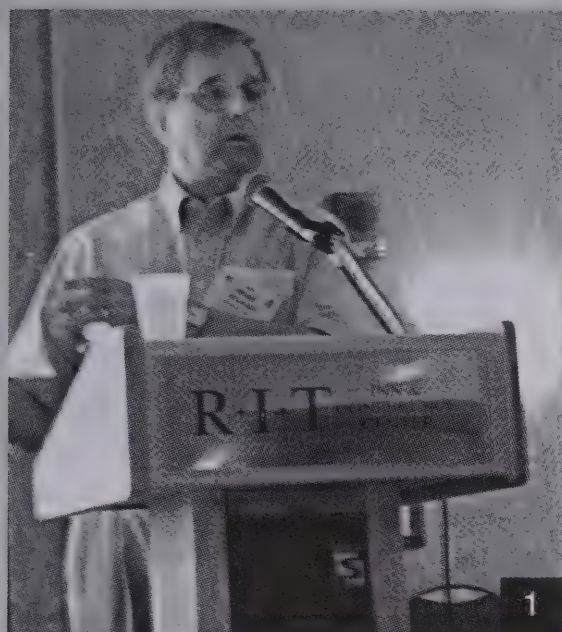
Verner's NBC Chimes Machine. It was developed by NBC to play their musical logo automatically at the push of a button. Merrill Bancroft won a blue ribbon with his father's Tuska radio and letters of confirmation of reception from stations he received in the 1920s.

Pete Yanczer won a blue ribbon with his mirror screw mechanical TV, which he built and had operating on the contest table. It is made up of a spiral of 32 thin flat stainless steel mirrors, one for each scan line. A bright clear 4" x 4" black and white (not red neon) picture is seen. Pete polished and aligned these mirrors into a spiral pattern himself and even will provide a kit if you want to make one. I thought this was the nicest thing I saw at the show.

For me the conference was a great success. I found some things I had been wanting for years and, even more important, reestablished acquaintances with many old friends. Don't think you live too far away to come next year. There were many collectors here from all over the world.



Tailgaters were blessed with fine weather throughout the conference.



1. Brian Belanger takes the podium for his detailed talk on the history of early radio detectors. 2. Bart Lee, a regular speaker at AWA conferences, presents an approach for researching and writing about radio history. 3. Lauren Peckham takes questions following his interesting talk on radio gadgets, given at the Moonlight Restorations forum. (Photo by Dick Ransley) 4. Mike Adams discusses Charles Herrold's pioneer broadcasting activities. 5. The Lieben, Reisz and Strauss (LRS) relay tube is the subject of Professor Franz Pichler's conference presentation. (Photo by Dick Ransley)

ANNUAL CONFERENCE CANDIDS



Fran Holly discusses quilting at the ladies' luncheon with an assist from Pat Muehlbauer (left).

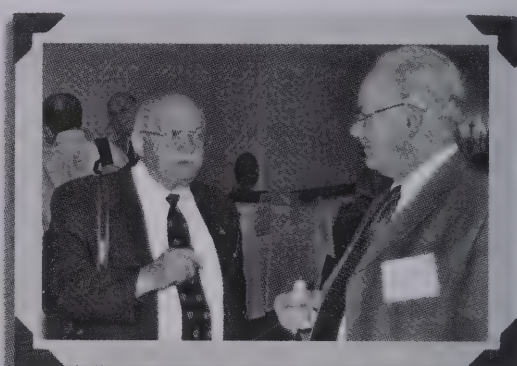


Auctioneer Walt Buffinton looks for bids on the strange item being displayed by assistant Chris Fandt (left). (Photo By Larry Babcock)

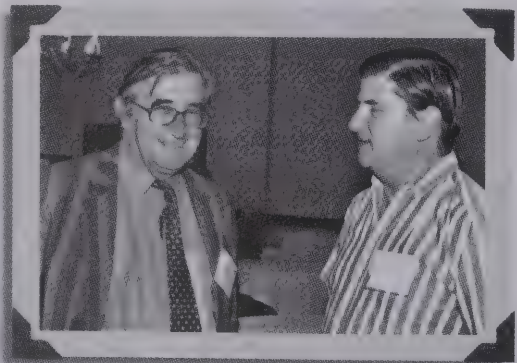
— A FEW OF OUR INTERNATIONAL VISITORS —



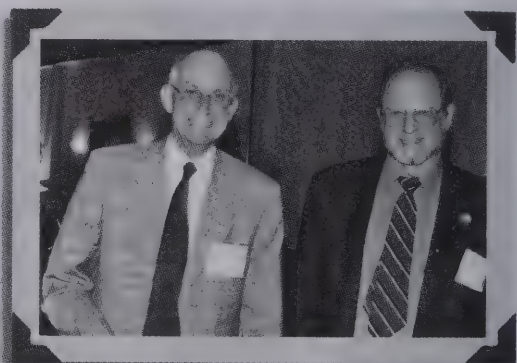
Alan Carter of the UK (right) with Lauren Peckham (left) and Bruce Roloson.



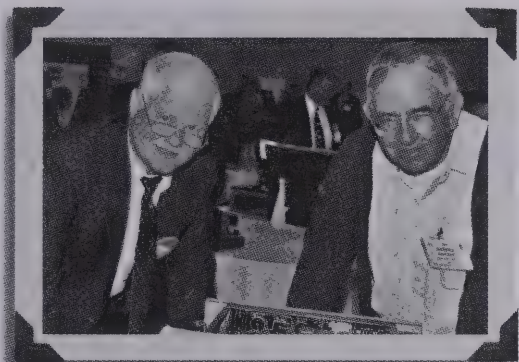
Malcolm Baird of Canada (son of pioneering television inventor John Baird) with noted mechanical television experimenter Peter Yanczer (left).



Franz Pichler of Austria (left) with Jim Kreuzer.



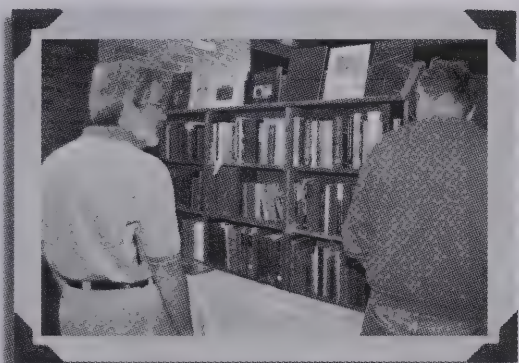
Bengt Svensson of Sweden (left) with Tim Walker.



Prize winners Merrill Bancroft (right) and Ernie Hite. Merrill won ribbons in no less than seven categories!



This year, banqueters were entertained after dinner with big-band era music provided by "The Greece Jazz Band."



The indoor book fair was open throughout the conference, and attracted lots of browsers.



Kathleen Davey (left) captured at the banquet with Edna (center) and Karen Yanczer.



Museum Curator Ed Gable (right) with one of the Jury twins (no, your editor does not know which one) chat in the contest room after the banquet.



Ray Seppler displayed a good variety of interesting items at his flea market table.

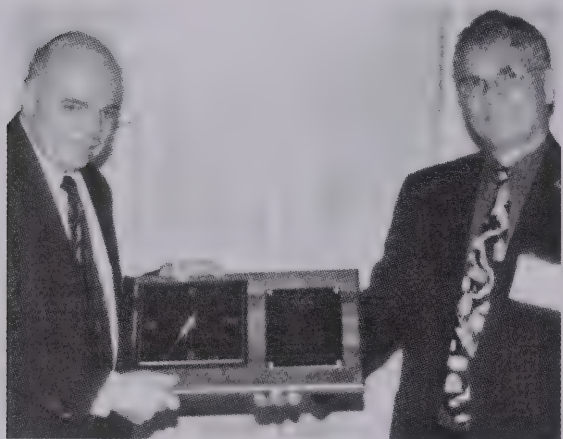
AWA CONFERENCE AWARDS REPORT

PHOTOS BY DICK RANSLEY

The AWA Recognition Awards

These awards are traditionally presented on the last evening of the conference at the gala "historical banquet." Nominations for the first six awards listed below are solicited from the AWA membership at large and each winner is selected by a special committee charged with administering that particular honor.

The AWA Houck Award for Documentation goes to an AWA member who has written several original articles on radio development or history in the *OTB*, *AWA Review*, or other publication. (This can include a book on a related subject.) *Winner: Bob Paquette for his research into, and documentation of, microphone history.*



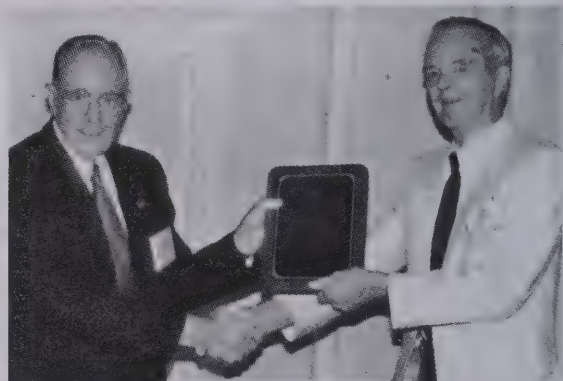
OTB Editor Marc Ellis (left) receives President's Award from AWA President Geoff Bourne.



Houck awards committee chairman Barney Wooters (right) presents Houck Preservation Award to Bob Paquette for his work in researching and documenting microphone history.

The AWA Houck Award for Preservation is for a member who, through personal accomplishment, has acquired, and preserved by documenting, an outstanding collection of radio artifacts. *Winner: Edward Gable for his tireless services as Curator the A.W.A. Electronic Communication Museum.*

The Bruce Kelley-OTB Award is given to the member who publishes in *The OTB* an article judged to be the most outstanding, original, historical presentation of the award year. For this year, articles in the August and November, 2003 and the February and May, 2004 issues were considered. *Winner: D.K Owens for his thorough and*



Ken Owens of the J. Albert Moore Award Committee (right) presents the plaque to Bill Fizette in recognition of his ongoing OTB column, "The Communication Receiver."



John Logie Baird's son, Malcolm (left), presents Taylor award to Ed Gable, A.W.A. Museum Curator, for his work in recreating John Baird's transatlantic TV transmission.

unique article on developing substitutes for the WD11 (August, 2003 issue).

The J. Albert Moore Award comes to us through the Antique Radio Club of America, which was merged into AWA a few years ago. The award honors Mr. Moore's contributions to ARCA. As given by the AWA, it recognizes the OTB article, or series of articles, deemed to be the most outstanding of those dealing with radio hardware (radio sets, radio systems or components) printed during the award year. The issues considered are the same as those considered for the Bruce Kelley-OTB Award. *Winner: Bill Fizette for his excellent series of columns: "The Communication Receiver."*

The Taylor Award, in memory of John Taylor, RCA TV Developer, is for "preserving televi-

sion history." *Winner: Edward Gable for his work on the recreation of John Logie Baird's transatlantic television transmissions.*

The Tyne Tube Award is presented, in remembrance of Gerald F.J. Tyne, for contributions to preserving or documenting the history of tube technology. *Winner: Bob Deuel in recognition of his outstanding display and documentation of his extensive tube collection.*

The President's Award is presented for outstanding service to AWA during this year: *Winner, Marc Ellis, Editor of The OTB.*

The Linc Cundall Awards are presented to the winners of the Linc Cundall Memorial Old-Time CW Contest—*Steve Hobensack, KJ8L, 615 points—and the Linc Cundall DX Contest—Bub Lundstrom, K1FI, 227 points.*

2004 Old Equipment Contest Winners

Compiled by Contest Coordinator Geoffrey Bourne and Chris Bacon

THE THEME CATEGORIES

Conference Theme: Broadcasting

Category 1. Transmitters

- 1st T. Walker
Eimac Transmitting Tubes
- 2nd Frank Feczko
Gates FM Exciter

Category 2. Microphones

- 1st Bengt Svensson
Reisz Microphones 1924-1935
- 2nd Marty Reynolds
Western Electric Model 7A
- 3rd George and Janet Freeman
Altec Model 21

Category 3. Studio Equipment

- 1st James Schreck
WFLR Equipment
- 2nd Peter DeAngelo
Western Electric Amplifier Rack
- 3rd Geoffrey Bourne
RCA Model MI-4223G Remote Board

Category 4. Recording Equipment

- 1st Gary Alley
Travis Tapak News Caster
- 2nd Charlie Milton
Western Electric 9A Cartridge
- 2nd Geoffrey Bourne
Western Electric 9A Cartridge and Tonearm

Category 5. Studio Accessories

- 1st Ed Verner
NBC Electronic Chimes
- 2nd Ken Lowther
NBC Hand Chimes
- 3rd Merrill Bancroft
WNDR Banner

Category 6. Open Category

- 1st Merrill Bancroft
DX-ing 1920s
- 1st George Freeman
Radio Marketing Display
- Special George Freeman
Paying for Broadcasting Display

THE STANDARD RECEIVER CATEGORIES

Category 7. Passive Receivers

- 1st Robert Murray
Fessenden Liquid Barretter
- 1st Bob Slagle
Nesco Receiver
- 2nd Bjorn Forsberg
AGA Swedish Crystal Set
- 3rd Tom and Karen Panola
1914 Kilbourne and Clark

Category 8. 1920s Superhet Receivers

No Entries

Category 9. 1920s TRF receivers

- 1st Robert Lozier
Magnavox TRF 50
- 2nd Fred Crews
Roth Downs Orpheus Model H

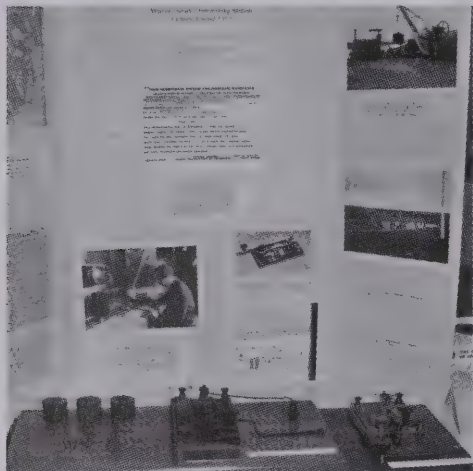
Category 10. 1920s Regen and Reflex Receivers

- 1st Bob Slagle
Colby Tuner and Detector
- 2nd Ernie Hite
Canadian Marconi Arcon Jr.
- 3rd Gary Alley
Allan 5
- 3rd Merrill Bancroft
Pennsylvania Wireless WCAE

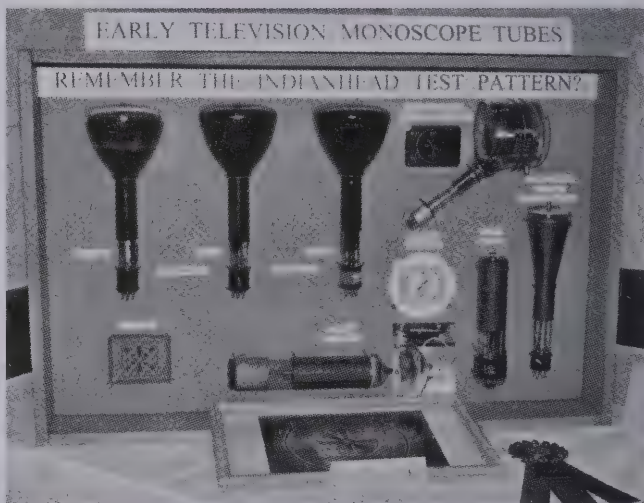
(continued on page 34)

SELECTED BLUE RIBBON WINNERS

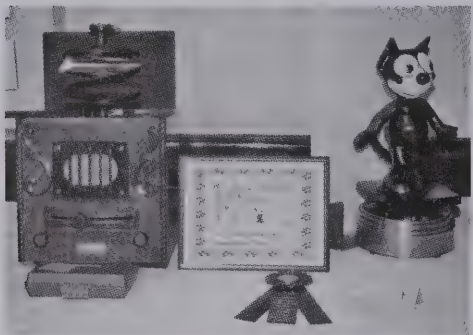
We wish we could show you all of the wonderful contest entries, but limited space allows us to show just a smattering. Here are twelve of the blue-ribbon winners that caught the photographer's eye.



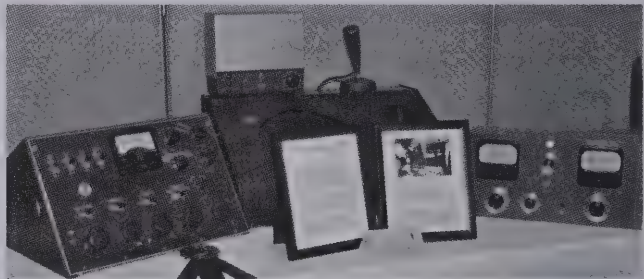
Top honors in "Spark Transmitters and Artifacts" went to James Kreuzer for his Marconi Clifden station key.



The blue ribbon in "Tubes" went to Floyd Jury for his display of early television monoscopes.



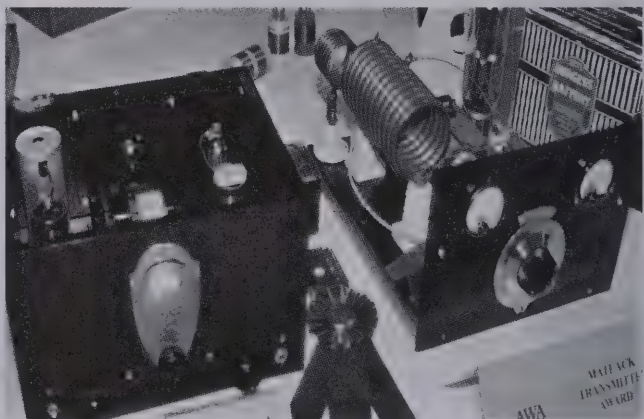
Peter Yanczer's working mirror screw television display was judged best in the "Television" category.



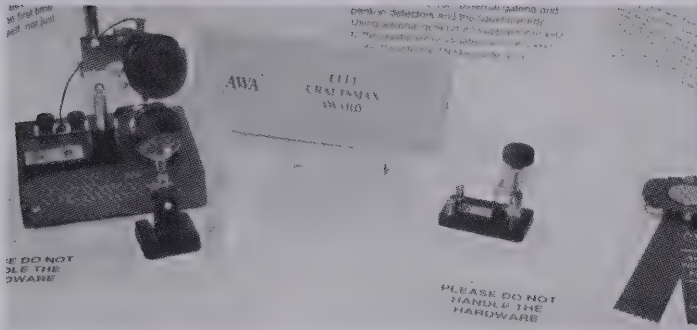
James Schreck's grouping of WFLR equipment was judged best in the "Studio Equipment" category.



Merrill Bancroft took the blue in "Portable Radios: Tube" for these TECLA sets.



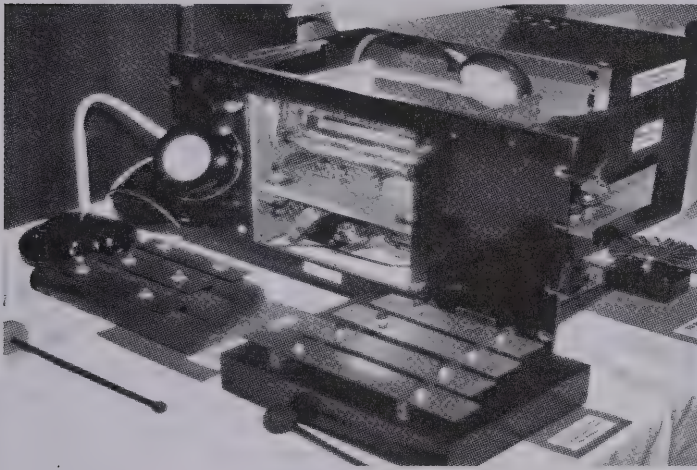
The blue ribbon in "Vacuum Tube Transmitters and Receivers: Homebrew" went to Stan Hojnacki for his beautifully crafted versions of a Hartley transmitter and National SW-3 receiver.



Top honors in "Passive Receivers" went to Robert Murray for his Fessenden Liquid Barretter display.



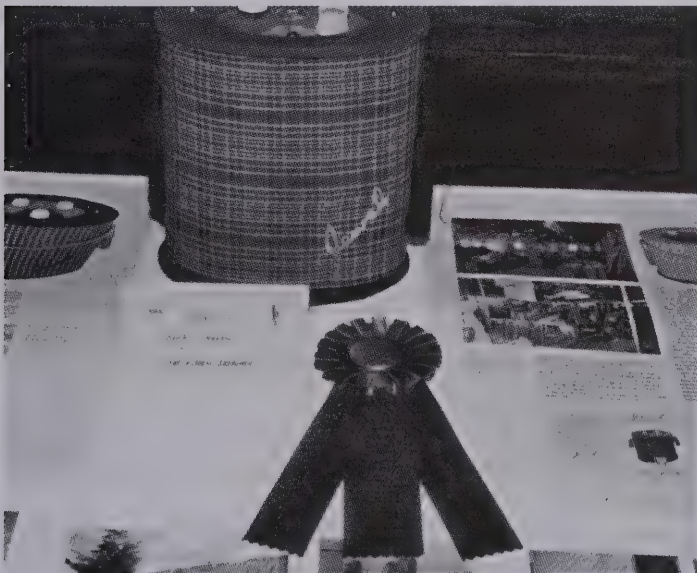
Bob Slagle won first prize in the "Horn Speakers" category with his Racon Dwarf Horn.



Ed Verner's NBC Chimes display took first place in "Studio Accessories."



Gary Alley walked off with the blue ribbon for this Travis Tapak "News Caster" portable tape recorder.



Top honors in "Radios in Disguise" went to Bengt Svensson for his TAE "Hidden Treasure" set.



Fred Crews carried off a "Cone Speakers" first for this Pacent 17" double cone unit.

(continued from page 31)

Category 11. Cathedrals, Tombstones and Consoles, 1930s and 1940s

- 1st David Kaiser
Detrola T-2 and T-3
2nd Merrill Bancroft
Atwater Kent Model 337

Category 12. Radio in Disguise

- 1st Bengt Svensson
TAE Hidden Treasure
2nd Lovlette Lowther
Stewart Warner Companion Book Radio
3rd Jayne Kaiser
Emerson Library Radio

Category 13. Portable Radios

- TRANSISTOR
1st Ed Taylor
50 Years Regency TR-1
2nd Michael Katz
Riga and Loewe Opta
TUBE
1st Merrill Bancroft
TECLA Portable Sets
2nd David Lum
1946 General Electric Model 250
3rd Bob McTeague
Arvin Model 5028-A

Category 14a. Horn Speakers

- 1st Bob Slagle
Racon Dwarf Horn
2nd Gary Alley
King Amplitone
3rd Merrill Bancroft
King Amplitone

Category 14b. Cone Speakers

- 1st Fred Crews
Pacent 17" Double Cone

Category 15. Test Equipment

- 1st Geoffrey Bourne
Prewar German Test Equipment
2nd Fred Crews
Triplett 1180/1181 Test Set
3rd Gary Alley
Jewell 210 Tube Tester

Category 16. Tubes

- 1st Floyd Jury
Early Television Monoscopes

THE AMATEUR RADIO CATEGORIES

Category 17. Spark Transmitters and Artifacts

- 1st James Kreuzer
Marconi Clifden Station Key
2nd Lloyd Jury
Dr. McCaa Display

Category 18. Vacuum Tube Transmitters and Receivers

- HOME BREW
1st Stan Hojnacki

Hartley Transmitter and Homebrew National SW-3

- 2nd A. C. Stoddard
1927 Aero Set
2nd John Rollins
1928-1932 Transmitter and VFO
COMMERCIAL
1st Geoffrey Bourne
1939 Philips Receiver
2nd Merrill Bancroft
Grebe CR-13

Open Category: Television

- 1st Peter Yanczer
Mirrew II, Mirror Screw Television
2nd David Kaiser
1948 NRI Television Kit
3rd George Freeman
Television Ephemera

THE CRAFTSMAN CATEGORIES

Category 19. Restoration of Appearance

No Entries

Category 20. Restoration of Operation

No Entries

Category 21. New or Rebuilt

No Entries

MAJOR CONTEST AWARDS

Eunice Thompson Best of Show Award

Ed Verner
NBC Chimes

Elle Craftman Award

Bob Murray
Fessenden Barretter

Matlack Transmitter Award

Stan Hojnacki
Hartley Transmitter

Ralph O. Williams Display Award

Lloyd Jury
Dr. McCaa Display

People's Choice Award

A. C. Stoddard
1927 Aero Set

CONTEST COORDINATORS

Geoffrey Bourne
Chris Bacon

CONTEST JUDGES

Ken Lowther
George Freeman
Gary Carter
Ken Owens
Chris Bacon
Geoffrey Bourne

AWA CONFERENCE AUCTION REPORT

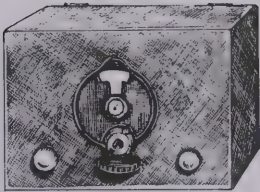
Sale prices for selected items from the AWA 2004 Conference auction records. Every attempt has been made to ensure accuracy in reporting these results, but the AWA cannot assume responsibility for any errors that may occur.

ADVERTISING ITEMS		SILVERTONE COMMUNICATIONS RECEIVER, Fair		\$90.00
AK DEALERS SIGN, Excellent	\$400.00	NATIONAL SW-3 WITH MANUAL, Excellent		\$165.00
BBC PERPETUAL CALENDAR, Good	\$100.00	NATIONAL NC-46 AND SPEAKER, Fair		\$55.00
RCA "BLOCK OF TIME"	\$22.50	HEATHKIT SB-401, Good;		\$95.00
RCA MAGNETRON DISPLAY, Excellent	\$50.00	HALLICRAFTERS HA-6, HA-2 POWER SUPPLY, Good		\$160.00
RCA COLOR TV SERV. BANNER, Excellent	\$20.00			
TINY-MITE, 2 PIECES, Good	\$50.00			
BOOKS AND MAGAZINES		CRYSTAL SETS		
BIG BUSINESS AND RADIO	\$75.00	FEDERAL JUNIOR CRYSTAL SET FEDERAL, Excellent		\$400.00
RADIO ENGINEERING, VACUUM TUBE, Good	\$3.00	XTAL SET, SMITHSONIAN, Good		\$16.00
INVENTORS AND INVENTIONS, C. D. TUSKA, Excellent	\$16.00	CRYSTAL DYNE CRYSTAL RECEIVER, Excellent		\$320.00
AIRCRAFT RADIO MN-55A, MN 53A, BENDIX, Fair	\$5.00	GRAFTON UNCLE TOM CRYSTAL SET, Excellent		\$700.00
OSRAM TUBE MANUAL	\$10.00			
OSRAM TUBE MANUAL	\$20.00			
BBC YEARBOOKS FOR '29, '45-'47, '52	\$25.00	MICROPHONES		
AMATEUR RADIO HANDBOOK, FRED COLLINS	\$110.00	ELECTRO VOICE 664 AND 636		\$32.50
BOX EARLY POP ELECTRONICS	\$12.50			
BOUND VOL1&2 EXP. WIRELESS, Good	\$20.00;			
OVER 200 SAMS CB RADIO SERIES, Good	\$10.00	MILITARY EQUIPMENT		
EARLY AK CATALOG, Excellent	\$42.50	BC-455, 7-9.2 MHz, Good		\$25.00
EI CO. CATALOG, Good	\$95.00	BC-453, 1190-550 kHz, Good		\$20.00
EDISON AND HIS INVENTIONS, 1898, J.B. MCCLURE, Good	\$460.00	BC-14 A RECEIVER BOX, Good		\$25.00
OPERATORS' WIRELESS TELEGRAPH, VICTOR, Good	\$30.00			
ATLANTIC TLGRAPH DISCOURSE, EZRA S. GANNETT, Good	\$360.00	OTHER		
FOREIGN CONSPIRACY, AUGUST LIBERT	\$150.00	20 EARLY QSL CARDS, Good		\$10.00
OF MIKES AND MEN, Good	\$5.00	WE 7A AMPLIFIER, Excellent		\$400.00
THE PEOPLE LOOK AT RADIO, Good	\$11.00	KENNEDY MODEL 521 AMPLIFIER, 2 STAGE, Good		\$1,000.00
TUNE IN YESTERDAY, JOHN DUNNIN, Excellent	\$12.50	RADIO JACKPOT PUNCHBOARD, Excellent		\$25.00
A PICTORIAL HISTORY OF RADIO, Excellent	\$10.00	QUIZ KIDS GAME, PARKER, Good		\$10.00
BITS OF WIRELESS HIST.	\$20.00	MORRIS COIL WINDER		\$50.00
QST MAY 1917, Fair	\$30.00	NAGRA MODEL #1V-S TAPE RECORDER, Excellent		\$1,150.00
TAYLOR 1940 CATALOG	\$15.00	MALLORY CNTRL ASSTMNT WITH SVCE ENCYCLO., Excellent		\$60.00
WIRELESS AND RADIO, GREENWOOD, Excellent	\$80.00	EIMAC TUBE DATA SHEETS & APPL. NOTES, Good		\$1.00
GE, RCA TRANSISTOR MANUALS, Good	\$6.00	UNKNOWN RADIO HORN, Excellent		\$85.00
ELECTRON OPTICS IN TELEVISION, MALOFF, Excellent	\$25.00	JAEGER TACHOMETER, Excellent		\$110.00
BELOW TEN METERS, JAMES MILLEN	\$30.00	45 PIANO ROLLS, Good		\$99.00
RADIO NEWS AMATEUR'S HANDBOOK, Excellent	\$85.00	EXIDE WET BATTERY, Excellent		\$20.00
THE ELECTRIC FURNACE, ALFRED, 1907, Excellent	\$5.00	MARCONI/WEING COHERER Excellent		\$120.00
ARRL H'BOOKS, 1977 & 1959, Excellent	\$2.00	COCA COLA AM/FM CASSETTE PLAYER, Excellent		\$45.00
RCA REVIEW JOURNALS	\$110.00	STEWART-WARNER R1313 CONVERTER, Excellent		\$45.00
4 EACH RADIO BOYS	\$30.00	RADIO TINKER TOY, Good		\$50.00
4 EACH RADIO BOYS	\$35.00	TUNER, UNKNOWN MANUFACTURE		\$1,150.00
4 EACH RADIO BOYS	\$30.00			
1926 LUDWIG HOMMEL CAT., Good	\$60.00	RECEIVERS		
1928 AMERICAN MESSENGER CAT., Good	\$75.00	ADDISON R-5 A-1, Good		\$1,300.00
TWO ISSUES TELEV. MAGAZIN, 1930, Good	\$60.00	AIR KING PORT-A-ROLA, Fair		\$5.00
WIRELESS WORLD MAG.	\$50.00	AMERICAN BOSCH MODEL #38, Fair		\$30.00
EXPERIMENTAL WIRELESS & W ENG., Good	\$27.50	AMRAD NEUTRODYNE, Excellent		\$320.00
4 VOLS ELECTRONICS MAG. 1944-45, Good	\$22.50	ATWATER KENT MODEL 10 BREADBOARD, Fair		\$500.00
ALLIED RADIO CATLOGS 1939, 1940, Good	\$25.00	ATWATER KENT MODEL 38, Good		\$65.00
		ATWATER KENT MODEL 145, Good		\$100.00
		ATWATER KENT MODEL 4910 BREADBOARD, Excellent		\$1,150.00
		BUSH DAC90A, Excellent		\$130.00
		CLAPP-EASTHAM HR-1, Good		\$160.00
		CLAPP-EASTHAM MODEL DD, Good		\$400.00
		CROSLEY MODEL VI, Excellent		\$150.00
		CROSLEY MODEL VI (early version), Good		\$280.00
		CROSLEY MODEL VIII, Good		\$420.00
		CROSLEY MODEL X, WOODEN TUNING CAP, Good		\$80.00
COMMUNICATIONS EQUIPMENT				
NATIONAL NC-303, Good	\$100.00			
NATIONAL MODEL NC-125, Fair	\$60.00			
HEATHKIT MODEL #SA-2060 ANTENNA TUNER, Excellent	\$200.00			

CROSLEY REPRO BLUE BIRD, Excellent	\$55.00	ZENITH 8G-005, Good	\$55.00
CROSLEY SUPER TRIRDYN REGULAR, Excellent	\$100.00	ZENITH 105567, Good	\$80.00
CROSLEY MODEL 5-75 BATTERY SET, Fair	\$120.00	ZENITH 10S669 CONSOLE, Excellent	\$100.00
CROSLEY MODEL 51, Good	\$85.00	ZENITH 8600ST21, Fair	\$90.00
CROSLEY MODEL 52, Good	\$75.00	SPEAKERS	
CROSLEY MODEL 148 CATHEDRAL, Excellent	\$125.00	STERLING DINKIE DRIVER, Fair	\$60.00
DEFOREST MODEL #D-10 + ANTENNA, Good	\$700.00	BURNS 205B, AMERICAN, Good	\$200.00
DELMONICO MODEL #FMS-413U, Good	\$20.00	MAGNAVOX M-4	\$60.00
EMERSON MODEL FG 330, Excellent	\$65.00	HORN FOR EARPHONES, Fair	\$160.00
EMERSON MODEL 511, Good	\$5.00	AMPLION AC-12 CONE SPEAKER, Good	\$75.00
EMERSON MODEL 520, Excellent	\$150.00	AMPLION MODEL AR-57, Excellent	\$460.00
FEDERAL 1921 PRITYPE MODEL, C.D. BARNES, Excellent	\$1,500.00	TELEGRAPH	
FREED FE-15, Good	\$35.00	INSTROGRAPH MACHINE, Good	\$9.00
GE C-400, Excellent	\$440.00	RETCHSTELEGRAPHENTASTE 1885 INSTRUMENT	\$30.00
GE MODEL S-22 JUNIOR, Good	\$150.00	WALETERS' LANDLINE KEY, UK, Good	\$65.00
GREBE CR-9, Good	\$420.00	VIADUCT REGISTER, Fair	\$32.50
GRUNOW CHROME GRILLE RADIO, Good	\$150.00	HOME MADE KEY, Excellent	\$60.00
GUILD COUNTRY BELLE, Excellent	\$20.00	TEST EQUIPMENT	
HEATHKIT MODEL AJ-30, Excellent	\$40.00	MEISSNER ANALYST, Excellent	\$70.00
HUDSON CLIPPER, Excellent	\$65.00	IN-STORE TUBE TESTER, Excellent	\$90.00
INTERNATIONAL MODEL 90, Excellent	\$200.00	SIMPSON MODEL 269	\$32.50
KENNEDY TYPE 281, Good	\$360.00	GENERAL RADIO 1001-A SIGNAL GENERATOR, Excellent	\$100.00
MAJESTIC 5B01A, Good	\$60.00	AN/URM-7 RADIO INTRFRNCE/MEAS. INSTRMNT, Excellent	\$25.00
MAJESTIC MODEL 92 CONSOLE, Good, Unknown	\$45.00	HEATHKIT OL-1 SCOPE, Good	\$12.00
MIDWEST MODEL X-18, Good	\$550.00	TEKTRONIZ TYPE 310 OSCILLOSCOPE, Good	\$40.00
MIDWEST MODEL 20-38 WITH DATA, Poo	\$12.50	WESTON MODEL 660 SET TESTER, Fair	\$7.00
MIRO MODEL R-3	\$340.00	TELEVISION	
MONTGOMERY WARD ENCHANTER, Good	\$75.00	DUMONT RA 370/375-A, Fair	\$10.00
MONTGOMERY WARD MODEL 345 FARM RADIO, Unknown	\$17.50	SCANNING DISK, UNKNOWN MANUFACTURE, Good	\$210.00
MU-RAD TYPE MA-13, Good	\$460.00	TUBES	
MURDOCK 7-TUBE NEUTRODYNE, Excellent	\$70.00	MIXED MARCONI & GEC OSRAM RAF TUBES	\$50.00
PHILCO ROLL TOP PORTABLE, Excellent	\$14.00	PAIR NEW 2A3s, WORN BOXES, Good	\$75.00
PHILCO MODEL 41-226, Excellent	\$90.00	228 MINIATURE TUBES, MOST NEW	\$20.00
RCA MODEL AVR-7 W/ CONTROL PANEL, Excellent	\$50.00	10 760L, NEW & USED, NATIONAL	\$16.00
RCA BX-57, Fair	\$21.00	7 8013A, LOOK LIKE NOS	\$7.00
RCA MULTIBAND PORTABLE, Good	\$90.00	8 MULLARD 8063	\$40.00
RCA RADIOLA III, Good	\$100.00	JAN 5BP1, Good	\$7.00
RCA RADIOLA III IN CUSTOM CABINET, Excellent	\$170.00	34 ARCTURUS GLOBE 201A	\$150.00
RCA RADIOLA V, Good	\$360.00	DEFOREST SPHERICAL AUDION	\$630.00
RCA RADIOLA 18 & 100A SPEAKER, Good	\$55.00	SIEMANS AND HALSKE TUBES	\$270.00
RCA RADIOLA 20, Fair	\$140.00	3 TUBES: ROYAL EDISON, COSMOS, HUMAVOX	\$65.00
RCA RADIOLA 26, Good, Unknown	\$390.00	3 WECOVALVE	\$30.00
RCA RADIOLA 60, Good	\$80.00	3 EDISON COSMOS	\$40.00
ROSSINI MODEL 6002, Excellent	\$200.0	MULLARD SW1	\$16.00
RH MACY RECEIVER, Good	\$80.00	MARCONI T-250	\$20.00
SCHAUB/PFORZH DEUTSCHER KLEINEMPAENGER, Good	\$220.00	WESTINGHOUSE KU-618	\$5.00
SCOTT 7-KNOB ALLWAVE 23 IN TASMAN CAB, Excellent	\$1,600.00	W.E. 239-A TUBE, TIPPED, Excellent	\$40.00
SCOTT 12-TUBE TUNER, Good	\$80.00	4 GLOBE 45s, Good	\$100.00
SERANADOR MODEL 952-S, Good	\$35.00	20 01A TUBES, Good	\$160.00
SHOWERS SPLIT-KNOB TUNING TRF, Good	\$70.00	4 ARCTURUS TYPE 26, 3 Good, 1 Dud	\$30.00
SILVERTONE MODEL 4500, Fair	\$30.00	ARCTURUS: 2 71A, 4 24A, Good	\$75.00
SPARTON BLUEBIRD, Excellent	\$2,600.00	ARCTURUS: 4 27, 2 80, Good	\$130.00
SPLITDORF MODEL 300, Excellent	\$60.00	6 45s, Good	\$75.00
STEWART-WARNER Model 525, Good	\$25.00	7 UX-199 6 Good, 1 Dud	\$50.00
STROMBERG MODEL 130-J, Excellent	\$370.00	3 EYE TUBES, good	\$50.00
UNITED ENGINE LAN-SING MODEL M, Fair	\$32.50	#1846 ICONOSCOPE	\$210.00
US RAD & TV GLORITONE MODEL 99A, Excellent	\$160.00	2 WD-11, 3 UX-199, All Duds	\$20.00
WEGAVE 301 DYN VOLKSEMPFANGER, Fair	\$260.00	#8093A ORTHOCON	\$9.00
WESTINGHOUSE AERIOLA SR., Excellent	\$180.00	NORTHERN ELECTRIC R 215-A, Excellent	\$200.00
WESTINGHOUSE RA/DA, Excellent	\$240.00		
WESTINGHOUSE RC, Good	\$230.00		
ZENITH SUPER VII, Good	\$80.00		
ZENITH MODEL 5S162, Excellent	\$140.00		
ZENITH 6S-229, Good	\$160.00		

AMATEUR RADIO

EDITED BY **JOHN F. ROLLINS, W1FPZ**, HC 33, BOX 150, ARROWSIC, MAINE 04530
PLEASE INCLUDE SASE FOR REPLY.



Bruce Kelley 1929 Memorial QSO Party

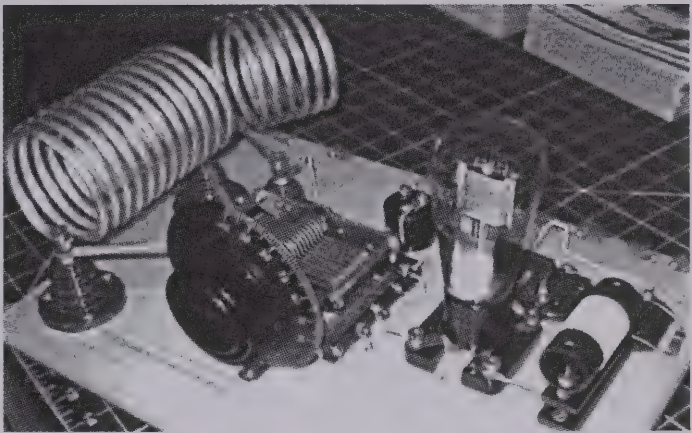
I recently returned from spending some enjoyable days at the annual AWA Conference in Rochester, New York. As usual, it was delightful to visit with old friends, listen to some of the lectures, and make the pilgrimage to the AWA Museum and Annex. I always come away inspired to start new projects.

At the meeting for Review of Amateur Operations, I suggested that participants in the '29 QSO Party consider operating on 40 meters as well as 80 meters. Hopefully, this would greatly improve the possibility of East-West contacts. The 40-meter proposal was approved by all members at the meeting.

There is time this year (October-November) for members to modify and test their rigs for two-band operation or even to build a Hartley just for 40 meters. Next year I shall try to delve into the various aspects of 80- and 40-meter operation, including coil configurations and outside doubler amplifier circuits to follow existing 80-meter Hartley or Colpitts oscillators. A report will be forthcoming. So have at it and I hope we all have fun. Please send your logs in early.

* Dates and Times: December 4-5, and December 11-12. Start at 2300Z (6:00 p.m. EST) and finish at 2300Z (6:00 p.m. EST), both periods.

* Objective: Contact as many other AWA members as possible. On contact, exchange RST, name, QTH (state), type of transmitter, year and power.



A beautifully constructed '29 TNT by Lou Vermond, VA3AWA.

* Rules: Transmitters must be 1929 or earlier types of self-oscillators, such as the Hartley, TNT, PP tuned grid tuned plate, MOPA etc. Participants are encouraged, but not required, to use straight keys.

* Power: Transmitters are limited to a power input of 10 watts or less. However, between the hours of 0500Z (12 p.m. EST) and 1300Z (8 a.m. EST), power may be increased to 20 watts to help make E-W contacts.

* Frequencies: Operation in the 80 meter band will be between 3550 kHz and 3580 kHz. Operation in the 40 meter band will be between 7030 kHz and 7050 kHz.

* Logs: Send all logs to John F. Rollins, 21 Bald Head Rd., Arrowsic, Maine 04530. 

AUCTION RESULTS, CONTINUED

STC M103-1G, Excellent	\$7.00
MAZDA TM263	\$35.00
MARCONI CATKIN, Good	\$30.00
RADIOTRON UX 120 WITH UR556 SOCKET ADAPT, Good	\$18.00
PHILIPS 1119	\$5.00
SRB RADIO BIGRID(DUAL GRID), Good	\$310.00
SEDDIG R.J.W, Excellent	\$200.00
RCA BRASS UV 202, Good	\$50.00
UNITED ELEC PAIR V70-D'S	\$10.00
PENTA PL-400A, Excellent	\$10.00
RCA 833-A, Excellent	\$15.00
WLS 4600	\$6.00

MACHLETT ED-5 X-RAY TUB, Excellent	\$25.00
WESTINGHOUSE 280, Fair	\$4.00
RVC 247, Good	\$7.00
HYTRAN/TUNSO HY512, Excellent	\$2.00
EIMAC 4-1000A	\$45.00
WESTERN ELECTRIC 216-A, Excellent	\$55.00
MYERS TRIODE, Excellent	\$45.00
NORTHERN ELECTRIC 215A (PEANUT TUBE), Excellent	\$24.00
PENTA LABS PL 185, Excellent	\$38.00
DONLE-CONN TEL UV BASE TUBE (TYNE P.338)	\$180.00
MULLARD EL37 (LOT OF 2, USED), Good	\$100.00
EMITRON KT66 (LOT OF 2, USED), Good	\$110.00
WE NT-2, Good	\$75.00

THE VACUUM TUBE

EDITED BY **LUDWELL A. SIBLEY**, 102 MCDONOUGH RD., GOLD HILL, OR 97525-9626

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Tube-Base Diagrams

Anyone who works much with tube literature will find basing diagrams designated with cryptic codes like “4D” or “7BK.” These were pin assignments designed by the manufacturer’s tube developers, then collected and standardized by an industry group. The latter started out in 1933 as the Tube Data Bureau of the Radio Manufacturers’ Association, ending up after numerous name changes as the Joint Electron Devices Engineering Council of the Electronic Industries Association.

There is a certain amount of meaning in these codes, as well as a lot of inconsistency. In this column we’ll try to develop some insight into the pinouts. Very little published material is available as to how codes were assigned, so what follows is mostly deductive.

Codes For Standard Tubes

Starting backward, the letter part of the code was simply assigned alphabetically, “A” through “Z,” then “AA” through “AZ” and so on.

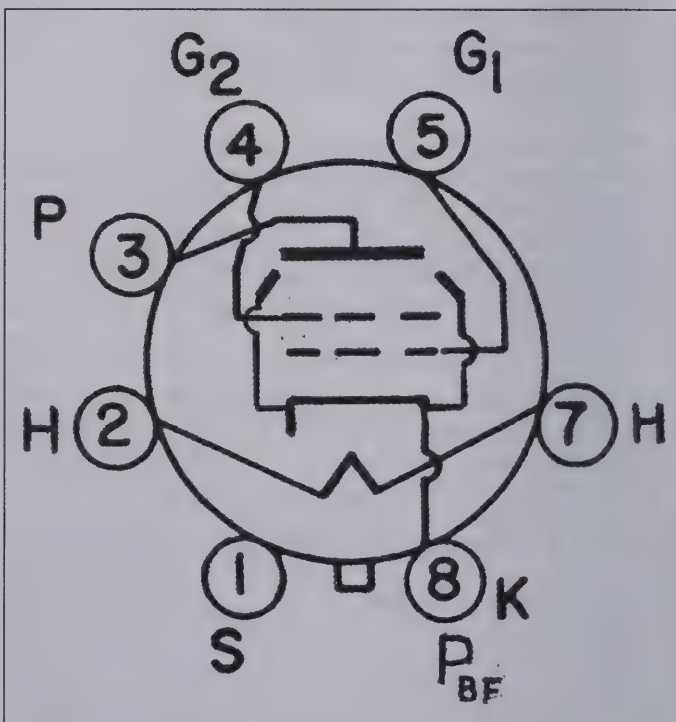
The numeric part of the code, early on, showed how many pins were being used in the base. Top caps were ignored. Thus codes 1A, 1B, and 1C went to photocells where one lead came through the base and the other went out a cap. (The tubes were the 917, 919, and 935 respectively, and the bases happened to be four-pin.) The codes in the “twos” went to numerous pinouts where only a pair of filament leads used the base—even an octal base—and similar cases. “Threes” and “fours” progressed similarly. However, there were ample exceptions, like the family of ballast tubes (1B1, 1C1, 1D1,...) that were given code 4A despite using only two pins on a four-pin base.

Numbering of base diagrams was straightforward on big-pin tubes that used five-, six-, or seven-pin bases. On these, the pins were all used—the designers didn’t specify a more complex

base than was needed. So a five-pin tube like the 35 got code 5E; the six-pin 41 received 6B; and the seven-pin 6F7 was assigned 7E.

However, introduction of the octal base in 1935 complicated the picture by making unused pins common. So a tube like the 5Z4, having four active pins and a metal shell, received base code 5L. This process continued with the arrival of the Loktal and seven-pin miniature formats; the code digit was often well below the number of pins. A given tube element was sometimes wired to multiple pins, in which case the multiple appearances counted. For example, the 0A2 miniature voltage regulator has only two electrodes, but they appear on a total of five pins, so the corresponding base code is 5B0.

This philosophy continued with the rise of nine-pin miniature tubes. The 2C51, 6AE8, and 6BA7 each had an unused pin and therefore carried an “8” base code (8CJ, 8DU, and 8CT respectively). The 12AT7 and similar dual triodes



Original diagram designated 7AC. Note depiction of the beam-forming plates.

used all the pins and so got “9” base codes (mostly 9A). However, the scheme changed with introduction of the 5763 and 5847 in 1949: these each have a spare pin, but carry “9” codes (9K and 9X respectively). All succeeding nine-pin tubes carried “9” base codes, maxing-out at 9RX.

A comparable process occurred with eight-pin subminiature tubes. Almost all carry an “8” base code even though they may have a spare lead or leads. The simplified numbering plan continued with novars (like the 7868, base code 9NZ), 10-pin miniatures (say, the 6C9, base 10F), and Compactrons (e. g., the 6K11, base 12BY).

Codes For Special-Purpose Tubes

The numbering of CRT bases followed a similar path. The obscure 12CP4 of 1940 used four pins out of the six available, and so its base was designated 4AF. “Modern” CRTs have the base

More on RCA's Base Names

Remembering RCA's imaginative Latin-based names for tube bases, as discussed in the last issue, it may be appropriate to recall that the company's first transistors were named using the same process. They devised the name Linotetrar for an array of up to four in-line pins or wire leads. Thus the 2N32 through 2N35 transistors shared a “small-oblong Linotetrar three-pin” base. The 2N104, 2N139, and six others up through 2N411 used a “small-round three-pin” version of the same base. And the 6694A cadmium-sulfide photoresistor was on a “small-rectangle two-pin” variant. However, after 1958 RCA began to discontinue this terminology.

code matching the potential number of pins in the physical base. Likewise with the bases on photomultipliers of, say, 20 pins.

The RMA had no reason to assign base codes for transmitting tubes until they started registering them in 1942. Until then, the editors of the *Radio Amateur's Handbook* and similar tube references had to come up with their own base diagrams.

It is not generally known, but there was a long series of base

codes (8FC through 8FM) that covered octal klystrons like the 2K25, 2K28, and 3K21. There was even a code (11R) for the Phasitron FM-modulator tube.

There is an odd gap in the RMA/EIA base assignments. The pinouts of a great many important tubes never received official base diagrams. Compilers of tube manuals had to identify a particular base diagram with the number of the first tube that used it. Raytheon and Sylvania did not

obtain identifiers covering a wide range of their subminiature tubes like the 1AD4 or 2E31 or 5702. So the submin 6540 is listed as using the “5702” base. RCA seems to have never pressed for assignment of base diagrams to its 5690 “Special Red” rectifier or 8808 nuvistor triode. There are plenty of other examples.

Western Electric made no use of the RMA/EIA base codes in its literature. Most WE tubes happened to use “official” pinouts, but numerous others did not and—being nonregistered—were “invisible” in RMA/EIA circles.

Enter the Beam Tube

RCA's introduction of the beam power tube in 1936 led to a difference within the industry regarding how to diagram it. There were initially two choices. The existing diagram 7S, originally intended to cover the 6F6 regular pentode, showed a conventional suppressor grid. The new diagram 7AC depicted a pair of beam-forming plates.

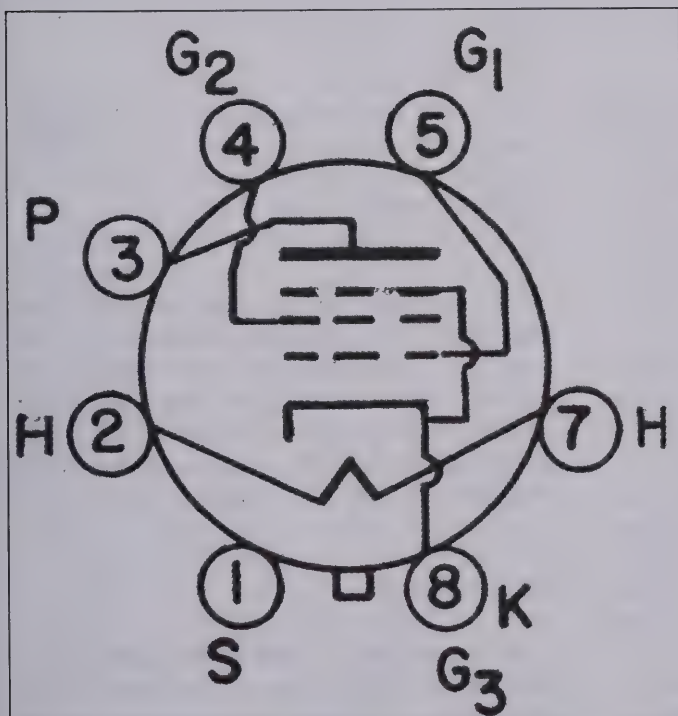


Diagram 7S was later also used as diagram 7AC (see text).

The following discussion of the “diagram struggle” centers on the 6V6GT, the most common beam power tube of its day, and how the manufacturers diagrammed it. RCA, the innovator, originally used 7AC. Around 1942 a new version of 7AC appeared, now showing a suppressor grid. RCA changed to it, staying with it up to the end.

Sylvania acted similarly at the start, changing to the “grid” 7AC in 1947. Then in 1951 they switched to 7S and kept with it. Raytheon similarly started with the beam-plates version of 7AC, but by 1954 had gone to 7S. Tung-Sol did the same, making the change in 1956.

By contrast, Ken-Rad as of 1944 was using the “grid” 7AC. Their successor, General Electric, stayed with that format until the end of tube production. Westinghouse, on entering the receiving-tube market in the '50s, also used the “grid” 7AC, as did CBS and Hitachi.

Yet others stuck with a depiction of beam plates. National Union, as of 1944, used the “beam” version of 7AC. Western Electric didn't make 6V6GTs, but their 1947 catalog diagram for the 350B shows beam plates.

The EIA apparently had the final bureaucratic say. Their 1958 booklet of base diagrams no longer showed a 7AC diagram, but says “See 7S.” It would be intriguing to know what political forces shaped this division within the industry over a relatively trivial matter. It would certainly would have been better graphic art to use a beam-plate depiction of beam plates!

Beware of Duplicates

The EIA/RMA had a penchant for inventing new diagrams that duplicated old ones. The following duplicates have been discovered so far, but there are probably others.

3V = 3L	7DZ = 7R
4CB = 4BR	7EN = 7CM
5AA = 5X	8AW = 8AJ
5CC = 5AN	8BK = 8BC
6AE = 6AA	8BQ = 6AZ
6BB = 6BA	8CK = 8CF = 8CE
7AC = 7S	8CL = 7CW
7AQ = 7AP	8DL = 8DE
7CC = 7BK	8FA = 8DN
7DP = 6AR	8LM = 8LK
7DR = 7DB	9BN = 9BH = 9BM
7DV = 5BS	9DE = 9AJ
7DY = 7AR = 7Q	9DM = 9BZ

Other diagrams differ in such minor ways as showing a pin as unused or Internally Connected. For example, 8GC is 8MW with a spare

pin changed to “IC.” The “Sylvania view” of the 7868 tube is 9NZ, which shows Pin 3 as spare. The “GE/RCA view” of the same tube is 9RW, which has on Pin 3 a warning of “LC” (“may be used only under Limited Conditions”).

The RMA/EIA would discontinue the registration of an obsolete or unpopular tube. Similarly, it would delete base codes for which there was no continuing need. The EIA 1958 catalog, for example, shows blank spaces on its drawing pages where diagrams 1D, 2H, 2L, 1M, etc. had been. This was efficient business practice but not helpful to tube-history enthusiasts!

A Dot Means Gas

Lack of a Dot Does Not Mean Vacuum

There was at one time a practice of indicating a gas-filled tube by putting a dot on its base diagram. But this marking was applied only irregularly. Looking at the gas tubes in the 1942 Radio Amateur's Handbook, dots were shown for the following:

- 0A4G thyatron (4V)
- 0Z4 rectifier (4R)
- 874 regulator (4S)

Dots were absent from other gas tubes:

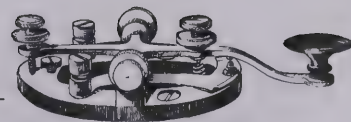
- 1 rectifier (4G)
- 2A4G thyatron (5S)
- 82, 83 rectifiers (4C)
- 866 Jr. rectifier (4B)
- 884 thyatron (6Q)
- 885 thyatron (5A)
- 2050, 2051 thyatrons (8BA)
- BA rectifier (4J)
- RK62 thyatron (4D)
- VR90 regulator (4SA)
- VR105, VR150 regulators (4SB)

One could argue that, in a diagram whose basic job is to show how to hook the tube up, the presence or absence of gas is irrelevant. In any event, the EIA eventually “stopped the dot,” removing dots from all diagrams in its 1958 listing. However, such widely used sources as GE's manuals continued to use them up to the end. ☐

REFERENCE

Joint Electron Device Engineering Council, Basing Diagrams for Electron Tubes Including Special Index, JEDEC Publication No. 2B (New York, Electronic Industries Assn., 1958) (copy by courtesy of Peter Keller).

KEY AND TELEGRAPH



EDITED BY **JOHN CASALE**, W2NI, 3 PICKERING LANE, TROY, NY 12180

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Relays, Keys, Registers and Sounders

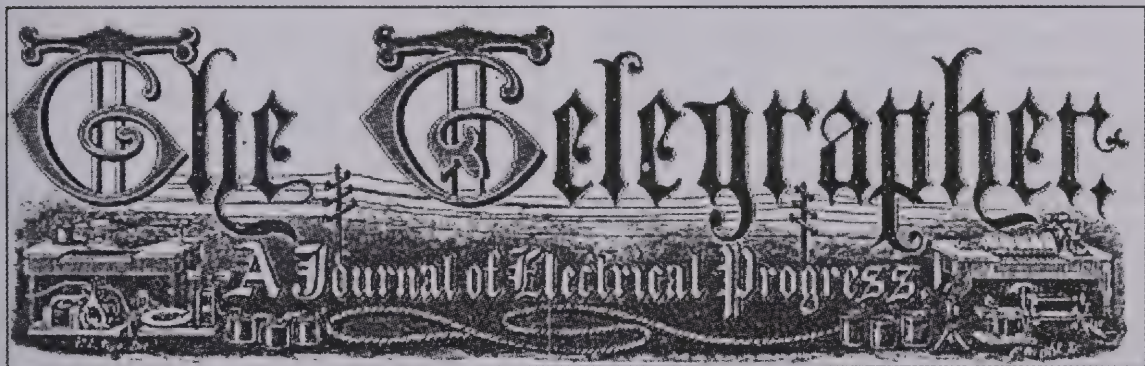
By Franklin L. Pope

From *The Telegrapher*, July 27, 1872

I found this rare article in the Western Union Archives at the National Museum of American History. It was written by Franklin Pope, who was both a respected and influential telegraph engineer and author and a frequent contributor to the popular 19th century telegraph magazine, The Telegrapher. This article is one of the earliest accounts of the development of telegraph instruments in the U.S. and provides a snapshot of its progress as of 1872. The article also offers a

different view of the inventors responsible for improvements made to telegraph instruments than has been previously documented by some contemporary authors. I felt it was important to republish Pope's article so it would be available to today's readers. Pope's wording and sometimes eccentric punctuation have been retained without change.—J. Casale

Note: parenthetical comments in italics are John Casale's and not author's. —Ed.



When we compare the elegantly designed and finely finished telegraphic instruments and apparatus turned out in such numbers from the workshops of our leading manufacturers with the crude, clumsy and imperfect machinery of the pioneer Morse line between Washington and Baltimore, we cannot but be impressed with the extent of the improvements that have been made in this department since that time. Many of the readers of this article have doubtless heard of the ponderous relays, weighing nearly two hundred pounds, and wound with No. 16 copper wire; the keys formed of a strip of sheet brass, with a metallic wedge inserted beneath them to keep the circuit closed; and the antique registers one of which is truthfully represented in the lower left hand corner of the engraved head of *The Telegrapher* which formed the equipment of the first telegraph line in America in 1844.

From that time forward improvements have constantly been made in different portions of the apparatus and mechanism. The cumbrous relays first employed were soon replaced by others of

more reasonable size. (James) Clark, of Philadelphia, first constructed a relay with the horizontal magnet, which has maintained its supremacy to the present day as the favorite and accepted type of the American relay. Morris Hall introduced the movable magnet, for facilitating the adjustment—an improvement which has since been almost universally adopted. G. M. Phelps covered the coils with hard rubber cases, and contrived a method of mounting the magnet which, for simplicity, convenience and durability, it is safe to say will not soon be excelled.

The first important modification in keys was the substitution of the rigid lever sounder (a straight key lever) with a spring and circuit closer for the strap key (strip of sheet brass) and wedge. The lever was the idea of Thomas C. Avery. Alfred Vail suggested the adjustable screw stops,

Above: The masthead, or "head" of The Telegrapher mentioned in the first paragraph of this article. The already "antique" Morse register, as Pope indicates, is (barely) visible in the lower left corner.

and Henry J. Rogers combined the whole into a practical and convenient instrument, by mounting the lever upon an arbor between adjustable centres. Mr. Rogers's key, which was made under his direction by Mr. James Green, was substantially the Morse key of to-day. Subsequently the key and circuit closer were combined together, different manufacturers using different devices for this purpose. The spring, or "snapping" circuit closer, so common at the present day, originated in the Caton shop, at Ottawa, Ill.

The register has, perhaps, undergone fewer modifications than any other portion of the apparatus. The greater portion of those in use at the present day bear a strong family resemblance to the original instrument, as will be evident upon referring to the engraving above alluded to. More ingenuity has been expended, perhaps, on contrivances for starting and stopping the clock work than on any other portion of the machine, with the possible exception of the paper guide. Palmer & Hall, of Boston, introduced a closed register many years ago, in which the works were protected from dust, and which met with considerable favor. This idea was subsequently carried out more elaborately by the Messrs. Chester, (of NYC) and quite recently Mr. Phelps, of the Western Union Company, has brought out a very beautiful and perfect register of this kind, far superior to anything hitherto produced in this country. *(A separate article on this register will be produced in the future.)*

Tradition is silent respecting the birthplace of the original sounder. It would not be hazardous to assert, however, that it was nothing more than a superannuated register, "razeed" (cut down) by some ingenious operator. The little "pony" sounder, of which not less than six thousand are clicking within the limits of the United States as these words are written, was invented by A. S. Chubbuck, of Utica, N.Y., and not a few operators still think that no one else can make them to sound quite as well.

All things considered, there is very little choice between the different patterns of instruments produced by either one of half a dozen of the best manufacturers in this country. It is perhaps as much a matter of taste and personal preference as anything else that influences the decision. In the elegance and appropriateness of their designs our manufacturers are confessedly superior to their European rivals, while in excellence of workmanship they fall little, if any, behind them. If they do not surpass them in the latter respect,

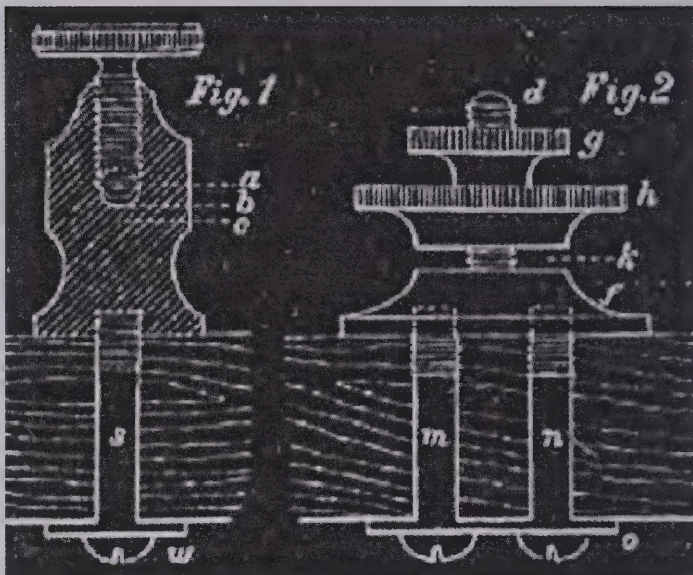


Fig. 1 and Fig. 2 as referenced by Pope in his discussion of binding post design.

also, it is only for the reason that the prices purchasers are generally willing to pay are as yet not sufficient to justify the production of articles of the highest possible degree of excellence. It is noticeable, however, that there is of late a marked tendency towards the use of a better class of apparatus, and an increased willingness to pay the difference in cost entailed thereby.

A person familiar with the practical manipulation of telegraphic apparatus can scarcely, however, have failed to become aware of the fact that there is still much room for improvement in some of the minor details of the instruments constructed at the present day. In connection with what has been said, a few suggestions upon this subject may perhaps not be out of place: There has been a very general tendency, within the last two or three years, to reduce the resistance of telegraphic relays. This is a reform in the right direction when not carried too far, as it has been in some instances. If it were absolutely necessary to equip every line with one standard relay, probably nothing would give better average results than a uniform resistance of about 150 ohms or Siemens units. This is rather high for a crowded railroad or city wire, and too low for a long through circuit with few instruments. Most of the relays now made measure from 100 to 150 units. In reducing the resistance, however, much better results would have been obtained by simply increasing the size and conductivity of the wire, instead of retaining the fine wire and reducing the size of the cores and helices.

Experiment proves that a relay, with coils three inches long by one inch diameter, and half inch cores, will work much stronger and better on a given circuit than one with coils 1½ inches long

and 1-inch diameter with $\frac{3}{8}$ -inch cores, and having precisely the same resistance. Relays of the latter dimensions are, notwithstanding, coming into very general use. A large share of their popularity is doubtless due to their small size and neat appearance. Both the manufacturers and purchasers of relays are now fully awake to the importance of using none but the best iron and the purest copper wire in their construction, so that nothing need be said on this score. A fact not so generally known was pointed out some years since by Mr. G. W. Dean, of the U.S. Coast Survey, who proved, by repeated experiments, that a longitudinal groove cut in each core of a relay, extending from the centre to the circumference, will cause it to charge and discharge with much greater facility, or, in other words, to "follow up" more quickly. This is an important improvement, and is worthy of general adoption. *(This longitudinal groove cut into the core of the electromagnet was used by Thomas Edison in several of his Quadruplex and printer designs later this decade. Pope was a business partner of Edison's a few years before this article was written.)*


Keys, as they are now and always have been made, are liable to become defective in two or three different ways: The lever is very apt to become loose on the arbor in the hands of many operators who "send" with a heavy side motion. It has been suggested, as a remedy for this, to have the lever cast either in the form of a cross or of a hollow rhomboid, usually known as a "diamond" shape. This would give the arbor a much longer bearing, and probably make a much better key. *(Nine years later, Franklin Pope was the patent attorney for Jesse Bunnell's Steel Lever Key patent. This lever design became an industry standard and is still recognized today as being cast in the form of a cross.)* The perfect circuit closer is yet a thing of the future. The brass lever sliding between two flat brass discs becomes worn by use so as to fail to perform its office, and it is no uncommon circumstance for the spring circuit closer to become deranged, so as to leave the circuit open about the thousandth part of an inch. What makes the matter worse in both the above cases is, that to all appearance the circuit may be firmly closed, as far as the key is concerned, and yet be open. There is certainly an ample opportunity for inventors to improve on the arrangements now in use.

Most of the sounders now made have one fault, which, although quite a serious annoyance, is fortunately capable of being very easily removed. The nut which controls the tension or the retracting spring ought to be double. It is almost always made single, and in nine cases out of ten cannot be made to stay in place, owing to the con-

stant vibration of the sounder.

One of the most prolific sources of difficulty in and about instruments is the American style of binding post. To any telegrapher of experience, its numerous and serious defects are sufficiently obvious. It constantly tends to work itself loose, and always succeeds in doing it sooner or later if left alone a sufficient length of time. The hole for the thumb-screw is seldom bored exactly to the proper depth. Sometimes it is too short, reaching only to the line (a) (see Fig. 1). In this case it is impossible for it to hold a small wire firmly, and the same trouble is frequently experienced with larger wires. Another post will, perhaps, be bored down to the line (c), the result of which is that the screw cuts off or breaks the wire, leaving either a very shaky connection or, quite as often, none at all, though everything appears to be all right, looking at the outside.

These posts are usually fastened to the base of the instrument by a machine screw, (s), provided with a washer, (w), underneath which the connecting wire is inserted. This arrangement is continually getting loose in consequence of the shrinkage of the wood, and very frequently gives rise to an imperfect connection, or not connection at all, between the washer and the loop of the wire. All the connections between the wires and binding posts of telegraph instruments ought to be soldered, but this is very seldom attended to, and much trouble and interruption arises in consequence. One of the best arrangements for a binding post that has ever been devised is that shown in Fig. 2. The upright stem (d) projects upwards from a base, (f) ; the wire is placed at (k) and looped closely around the stem (d); then the nut (h) is screwed down upon the loop and fastened by the lock-nut (g). The whole is secured to the wooden base of the instrument by two screws, (m) and (n), passing through a single washer, (o). The connecting wire should be passed around (m) and (n) and well soldered.

It would be well if practical operators would occasionally call attention to the defects of the instruments with which they work, and suggest means of avoiding them if any such should occur to them. The mechanics who design and construct telegraphic apparatus not being, as a rule, practical operators, cannot reasonably be expected to foresee and provide against all the contingencies that arise in practice from different forms and modes of construction, but they may doubtless be led to adopt such modifications and improvements as may be found, after discussion and experiment, to be advantageous or desirable. *To learn more about Franklin Pope, see the August and November 2000 issues of The OTB or visit <http://www.telegraph-history.org/pope/>.* 

RADIO OPERATING IN A MUSEUM SHIP

All you CW operators out there picture yourself in this scenario. It is 1944, you are a young navy radioman. You have just finished a four-hour watch copying five-letter coded groups on a manual typewriter. You remember the kind. You needed to apply pounds per square inch of finger pressure to make the keys travel downward an inch or so and then at the end of a line you slapped the carriage return lever to move down to the next line and start over at the left margin. You had to store all or part of the next code group in your head as you returned the carriage and then get your fingers to catch up with the steady incoming stream of morse characters.

Now complicate this further by being in the South Pacific where the daytime temperatures are usually in the nineties and humidity is right up there too. You pulled your four hour watch sitting with six or seven other radiomen, all wearing just shorts, in a room that has maybe 150 square feet of floor space and is ventilated by two 8-inch diameter outside air grills in the ceiling. The walls are all solid steel. The floor and ceiling are steel. There is no air conditioning.

Each radioman sat in front of a RBB or RBC receiver made for the navy by RCA. Each of these 82 pound behemoths has 19 thermionic tubes and converts roughly 58 watts of input power mostly into heat. The hatch (door to you landsmen), is closed and latched. You are four decks down on the starboard side of a battleship's huge sixteen inch gun turret. Those guns, under radar control, could lob a projectile roughly the weight of a VW Beetle at a target 20 miles away.

through my head on a recent weekend in July in my new hometown of Wilmington, NC. After moving here in May, I quickly hooked up with the local ham club and was invited to participate in a special event operation for Museum Ships Days. The WWII battleship USS North Carolina resides here as a museum and memorial to the war dead. It sits just across the Cape Fear River from downtown Wilmington on Eagle Island, the site of the Confederate-period shipyard where the ironclad CSS North Carolina was built.

After meeting for breakfast at a local restaurant,



All this came streaming *The U.S.S. North Carolina.*

several of us arrived at the ship just as it was opening up for tourists. We were greeted by a jaunty ex-navy machinist's mate who had spent three years as a crewman aboard this ship during WWII. He now volunteers his time as a tour guide.

Over the gangway and onto the main deck we made our way forward to those big gun turrets and entered a hatch just to the port side of number two turret. Then we climbed down four flights of very steep stairs (maybe they ought to be called ladders?). Proceeding across a machine shop, past the radar gun control center, through a power distribution room, into and out of the decoding room, into radio central, and then through the final hatch into the receive-only room I've already described.

July weather in coastal North Carolina isn't much different from that in the South Pacific. We only had one of the RBC receivers turned on as a monitor. There were only three or four of us in the room. We brought a large cooler filled with drinks. It was still hot and humid. The outside air flowing from those two little ceiling vents was fresh but no cooler than the air in the room.

We operated 20 and 40 meter SSB using a modern ICOM transceiver connected to one of the original receive-only vertical antennas up on the ship's superstructure. Any antenna on the upper part of the ship can be connected to any send or receive position through a patch panel in Radio Central. Each of the RBCs and our ICOM were connected to their respective antennas through a jack located directly above each position and via that central patch panel. For receive-only purposes, several positions could be connected to the same antenna at the same time.

The transmitters aboard the ship are in the process of being restored to full operational capability. They are on the deck immediately above Radio Central. However since they are not capable of SSB operation they were not used for this event. One of my goals is to get at least one of these transmitters into operation next year for CW operation on Museum Ships Days.


We made a little over 600 contacts over the



Peeking through the hatch into the cramped receive-only room. Note indispensable drink cooler in background.

weekend, including about a dozen other museum ships around the country. We logged some DX stations too. One operator actually stayed aboard the ship overnight and made some interesting contacts. It was particularly fun for me, who has spent a lot of unproductive time on the sending end of DX pileups, to be on the receiving end for a change. All of the operators trying to work us were polite and respectful. They seemed genuinely pleased to be assured of receipt of a picture QSL card from NI4BK. The WWII callsign of the USS North Carolina was NIBK.

Our cubbyhole was visited by many tourists who found their way off the marked tour route by following the sounds of our operation. A local TV news crew showed up and spent over an hour with us filming and interviewing each of the operators. Two of the operator interviews and a picture of my right elbow made it onto the evening news. The interviewer, certainly born long after the demise of vacuum tubes in household electronics, seemed baffled as to why we were enduring the heat, humidity and claustrophobic room just to talk to all those people calling us in the pileup.

We do it because we can and we think it is fun is a simple glib answer. It is those things to be sure. But the real reason, which I never mentioned to her, is to refresh in our minds the memory of those young navy radiomen sitting in that little room in their shorts sixty years ago doing what had to be done. 

THE COMMUNICATIONS RECEIVER



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A Home-Brew SW-3-Inspired Receiver

By Stanley Hojnacki, WA2NPL
103 Wilson Ave., Blackwood, N.J. 08012

Those members who were at the AWA 2004 Annual Conference had the pleasure of viewing some unusual exhibits in the equipment contest. Among these were two very interesting entries by the author of this article: a one-tube 211 Hartley transmitter, and a receiver using National parts and the essential circuit of the famous National SW-3 regenerative receiver. The thinking behind the design is unique and the workmanship is exceptional. In fact the pair won Stan the blue ribbon in the "Home Brew Vacuum Tube Transmitters and Receivers category." Here Stan discusses his receiver and it should give you some good ideas even if you don't wish to replicate the design.—wf

Although the superheterodyne had been invented by E.H. Armstrong in 1917, full and efficient use of that design would not

come until improved, more economical components could be made available. And so the simple regenerative detector with audio amplification, and occasionally including some type of r.f. pre-selector, would remain popular well into the late 1930s.

In 1931 the National Company of Malden, Mass. introduced the SW-3 receiver. It was born out of the SW-5 receiver which was designed to operate from AC mains and drive a loud speaker. The SW-5 employed efficient ganged tuning of the RF and detector circuits. Prior receivers typically had to have the r.f. stage(s) and detector resonated separately, a cumbersome procedure.

Because the SW-5 solved this problem, and in the process introduced single-dial tuning, it was a very popular receiver. However National's customers, especially the burgeoning airline industry, wanted a more compact, lighter and versatile model. This factor, coupled with the economics of the cash-starved Depression years, led to the

SILENT KEYS

We record the passing of the following AWA members with deep regret.

JOHN H. GUTHRIE, W3GJ, 85, (4-22-04), St. Marys, PA.

BRIAN L. L'HUILLER, Brownville, NY.

ROBERT W. PERRY, W2TIX (ex-WA2TIX), 71, (7-30-04), Painted Post, NY. A retired environmental engineer from the Corning Glass Works, he was a Trustee and Secretary of the A.W.A. Electronic Communications Museum. See the "Museum News" column in this issue for more on his work with the Museum and other organizations. Perry's article "Radio-Equipping the America" was published in *The OTB* (40-2-40). His collection of antique radios numbered about

300 items. During the Korean War he served as a Radio Intercept Officer with the 14th U.S. Army Security Agency Field Station in Japan.

WESLEY "WES" C. RANGLES, W4COW (ex-W8FEX, KL7CBZ & K1HTK), 86, (5-19-03), communications engineer. Randles worked in broadcasting from 1929 until 1942, when he joined the Raytheon Production Company. During World War II he was a Technical Representative for the firm, involved in and radar installations in the Pacific theater. He retired from Raytheon in 1980. Randles was the Treasurer (1982-1996) and Activities Manager (1979-1982) of the Quarter Century Wireless Association, Inc. He was also their Historian and authored "QCWA 1947-1997 Reflections of the First Fifty Years" (*QCWA Journal*, Winter 1997, p. 9).

DR. DESMOND P.C. THACKERAY, (9-12-03), university lecturer and radio historian.

simpler SW-3 design.

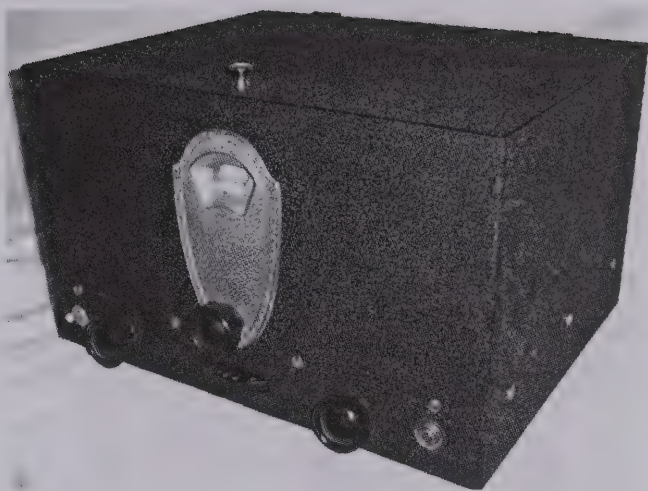
The receiver described here was inspired by the SW-3 and is typical of receiving equipment of the 1930s. It was designed to cover the short-wave spectrum and employs circuit design and employs components from that era.

The Point of It All

A lot has been written about communications receiver design philosophy. Just about every possible point of view has been addressed in the pages of *The OTB*, and elsewhere. I have enjoyed all the projects I've read about in *Electric Radio Magazine*, particularly Bob Dennison's construction articles. But we don't need yet another "how I done it" article, so I'll try not to bore you with that.

In the hands of a competent operator, almost all of the simple regenerative designs still serve well for most of the work done on the amateur bands. If you have ever built and tried one, you already know that, when stacked-up against your R-390A, they can and do hold their own in all but the worst QRM. And they actually are somewhat quieter than their superhet big brothers.

The National Company SW-3 has been a favorite here for a long time. Quaint, lots of fun to use, able to clearly copy all modes—even SSB. But there is one drawback—it can't really drive a loudspeaker. I don't know about you but I don't



Stan's superb paint job gives his SW-3-inspired receiver a commercial appearance authentic for the late 1930s.

like wearing headphones for long periods of time. Since I generally don't operate in noisy environments a speaker would be much better.

So that's how this project got started. Having been interested in the SW-3 I restored a number of these fine radios and, during the process, I built up a small quantity of spare parts. When the desire to restore any more SW-3s faded I started looking at building a copy that would have the operating conveniences that I personally wanted.

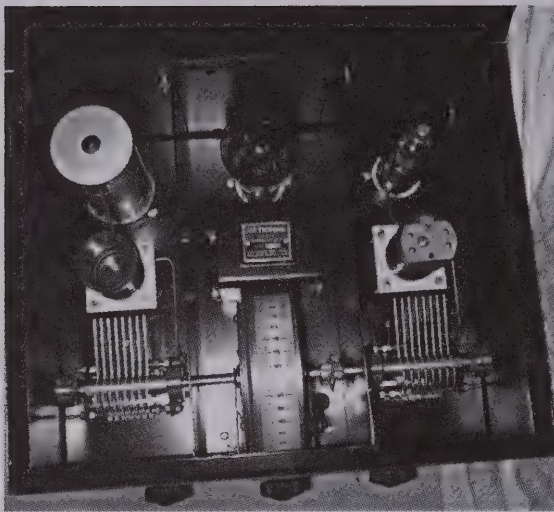
Besides a speaker-level output, these included the addition of B+ switching, switching the transmitter and antenna right at the receiver, and finding a use for these really nice Equicycle National

Thackeray had been a member of the faculty of the Department of Music at the University of Surrey in England. He taught musical acoustics, electroacoustics, electronics and the history of radio. Earlier he worked as a Senior Scientist with Vickers Research Ltd. and as a teacher and researcher of optics, spectroscopy and crystallography in the Department of Chemical Physics at Surrey. After retirement, he concentrated on research interests in the early history of crystal detectors, thermionics, HF inductors, arc and spark gap technology, quartz crystals and radio test meters. Much of his work has been recorded in articles published in *The OTB*, *The AWA Review* and the *IEEE Spectrum*. Thackeray was also a member of the British Vintage Wireless Society and a Fellow of the Royal Photographic Society.

GEORGE E. WARDER, 68, (7-1-04) worked at Haun Welding as an electrical technician and

also owned a TV repair business in Fulton, NY. He was a veteran of the Navy.

MURRAY D. WILLER, VE3FRX, 91, (5-28-04) mechanical engineer. While a senior executive of A.V. Roe & Company Ltd. he helped construct the Canadian version of the Lancaster bomber. In 1960 he founded Willer Engineering, Ltd., a manufacturers' representative firm in the field of measurement and instrumentation. He was inducted into the Engineering Alumni Hall of Distinction by the University of Toronto in 2002 and also received the Malcolm F. McGrath Alumni Achievement Award. Willer's collection of about 500 Morse telegraph keys, signaling lights and mirrors was thought to be the largest assortment in Canada. He and Louise R. Moreau, W3WRE, wrote a paper entitled "Foreign and Military Telegraph Keys" for *The AWA Review* (R-3-98). He also moderated the Key and Telegraph session at the AWA Conference in 1996.



Top view shows a radio that could have easily just emerged from the National factory.

tuning capacitors I had lying around. These capacitors are a throwback to the 1920s kit-building craze and were also used on the SW-2 (do you know that one?) They're just so pretty I was itching to build them into something. *NOTE: The Equicycle capacitor, as described in the 1930s National catalogs, is a straight-line frequency design, on a girder frame, with 270-degree rotation.*—wf

The nice thing about the Equicycle capacitor is that it can be disassembled and then put back together to turn in the opposite direction. Because I would be using the National drum-type dial (*National Type F.*—wf), this was a necessity. The units are heavy duty, with a cast aluminum frame and thick wide-spaced plates. They also have the same total capacity as the ones used in the original SW-3.

A word about the hard-to-get National S-101 audio coupler. Although I had one for this project, I've made up several using the plate choke from a discarded BC-221 frequency meter, mounted in the case from a junked NC-100 series power-supply choke. That case is the same size as the S-101 coupler and is similar in appearance.

Pull the guts out of the old choke case, insert the BC-221 plate choke along with a 0.01mF capacitor and a 0.25 megohm resistor, pour in a big lump of epoxy, and presto! You've got an audio coupler. Although inductance values of the BC-221 chokes run from less than 100 H to about 450 H, depending on revision number, they all work about the same as the National original, which ran from 750 H to 1050 H.

As for the rest of it, I went to a local scrap yard and bought some thin-gauge cold-rolled sheet steel to make the cabinet. I made all my cuts using a saber saw (NOT fun). I also had temporary access to some sheet-metal bending equipment of the kind used for doing ductwork. If you

go this route buy extra sheet metal to compensate for the necessary learning curve. Although I'm pretty handy with things mechanical there's no rocket science involved in doing this. So try building your next project this way.

Spend time giving your project a finished "commercial" look. It will pay dividends. The paint used was Plastikote black satin for the inner surfaces and Plastikote black wrinkle for the outer surfaces. The satin coat was easy, the wrinkle not so. Best results were obtained when I did the paint-work outside on a sunny day with low humidity.

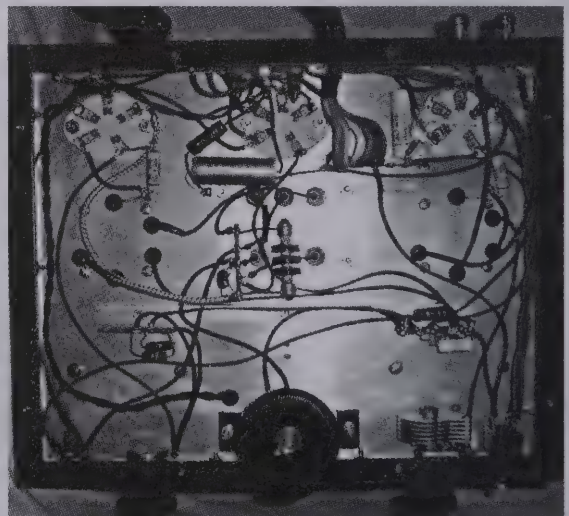
The wrinkle must go on THICK, three coats, making sure the previous coat hasn't dried. Turn the cabinet so that the surface you are painting is horizontal. After allowing about three days for it to dry, you can move to the next surface (making sure to mask off previously-finished areas). If you try to paint the entire cabinet in one sitting chances are the paint will run down the vertical surfaces. Then you will have to strip off the mess and start again.

How Does it Work?

Just fine. In fact, just like the National SW-3, except that we now have speaker as well as head-phone output. The National Type F dial has a fixed 6:1 ratio, as compared to the SW-3 type-B drive, which is adjustable from 6:1 to 20:1. This causes no special problems. As with all National vernier dials operation is very smooth.

One problem that I did have, however, was severe interlocking of the controls. The effect of adjusting any one control, such as the antenna trim, would require the regeneration to be readjusted. After trying a few simple fixes that didn't work, I shielded the RF amplifier plate lead going from the tube to the high side of the primary of the DET coil

(continued on page 50)



A peek under the chassis suggests the simplicity of the receiver's circuitry.

BVWS THROWS A GARDEN PARTY

The British Vintage Wireless Society held its twentieth anniversary Garden Party on June 5, 2004. As usual, this annual event took place at the BVWS Museum just south of London. About 100 members and guests attended the standing-room-only event, which was fully catered and lubricated. The Museum, which has just achieved legal charity status [like a US IRS 501(c)(3)], is housed in and around the home of Principal Gerry Wells. Gerry's daughter will carry on the work of the Museum in its new legal form.

The guests marveled at the collection and the displays, which comprise more than 1300 vintage radio and television artifacts. These are placed throughout the home and its many outbuildings—which include workrooms, a glassblowing studio and a shop.

Special guests included BBC presenter and radio collector Lesley Curwen (the lovely redhead standing beside Gerry in an accompanying photo) as well as AWA member Bengt Svensson who flew in from Sweden.



Gerry Wells with BBC presenter and radio collector Lesley Curwen in one of the museum's workrooms.



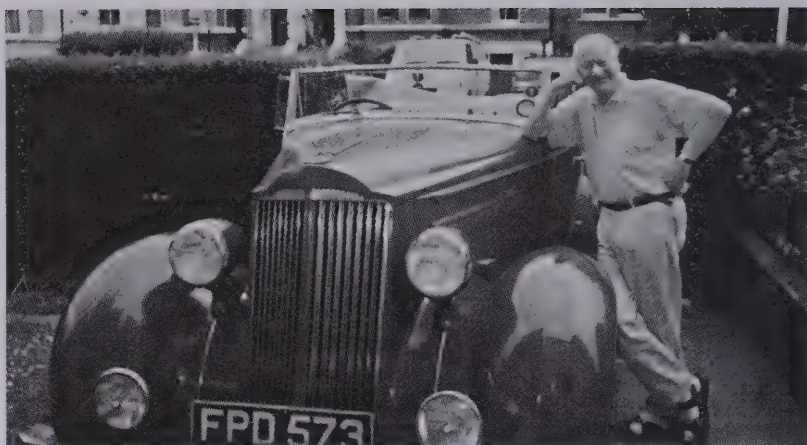
Scene in the garden with the party in full swing.

595 MARKET ST., SUITE 1350, SAN FRANCISCO, CA 94105-2825


Frequent AWA conference guest Alan Carter appeared with his 1937 red Packard convertible. Besides the good food and excellent company, this annual event was livened by music, raffles, and old radio quizzes. All in all a splendid and amiable affair.

Gerry recently published his biography: *Obsession—A Life in Wireless*, available from the Society at www.bvws.org.uk. Also among the books available at the site is BVWS member Julian Alderton's new *The Tannoy Story*, which traces the history of the audio products company that might be considered to be the British equivalent of our own Magnavox.

To join the British Vintage Wireless Society,



Alan Carter, a familiar face at our own annual conference, arrived at the party in his red 1937 Packard convertible.

send £28 (about \$50) to BVWS Membership, 26 Castleton Road, Swindon, Wiltshire SN5 5GD, England, United Kingdom. VISA and MC are accepted. Questions? Send an e-mail to membership@bvws.org.uk. 

COMMUNICATIONS RECEIVER, *continued from page 48*

and the lead from the low side to the r.f. amplifier B+. This all but eliminated the interlocking problem and improved the action of the regeneration control at the same time.

This receiver accepts SW-3 coils and any bandspread type can be used. No provision was made for general coverage. The 6:1 ratio would have made tuning a bit tedious. In any case, I wanted a strictly amateur-band receiver. Because of the RF amplifier stage this receiver produces so much gain that using a resonant antenna system is unnecessary. A wire about 25 feet long for 80 meters and about 15 feet long for 40 meters is adequate. If necessary, I detune the antenna trim control to reduce overload (no AVC here!)


Like the SW-3 it was modeled after, this receiver is very quiet until tuned across a signal...then WOW! Prior to constructing this radio I built one with an untuned RF amplifier. It has nowhere near the gain of this set, but it does have a lower noise level and is more pleasant to use on high signal levels.

Finally, although the SW-3 used a type 27 in the output (*Not always; depended on the model.—wf*), I chose a type 47. It uses the same socket as the 27, and works better for a loudspeaker. The RF is a 35 and the DET a 24-A. If you look in an old tube manual you'll find a multitude of suitable types from the 1930s, including

metal tubes. Cloth-covered wire was purchased from Antique Electric Supply (www.tubesand-more.com). AES also has many of the other parts you might need. Of course, go to hamfests as well. Build something! You'll like it.

The author of this project did an excellent job in both design and construction. Note the inclusion of the send-receive switch and the headphones jack on the front panel, features not found in the National SW-3. If the reader wishes to delve deeper into the physical design of the SW-3, the original QST article, often reproduced in the SW-3 manual, discusses shielding at length.

The cabinet construction was done the hard way, as Stan notes. It would have been easier by far to have the sheet-metal shop cut the metal to size on the big shears and bend up the angles at the same time. Regarding the paint job, those of you who saw the receiver at the AWA Conference will have to agree that it is superb. I for one, can only hope, someday, to do as well some..

The S-101 coupler substitute is ingenious in its use of a choke from a BC-221 frequency meter, and this trick should help many a restorer. Close inspection of the receiver photos did not show the audio output transformer for the 47, so it is probably mounted on the speaker, a common practice in the '30s.—wf 

VLADIMIR K. ZWORYKIN'S CONTRIBUTIONS TO THE RCA ELECTRONIC TELEVISION SYSTEM

Part 1 — The Kinescope

During the 1920s, intense efforts were being made to develop television into a viable medium of communication. A number of dedicated persons throughout the world were working on the problem. Actually it was believed as early as the 1840s that the use of electricity to transmit images over long distances was a logical extension of wire telegraphy. With radio broadcasting already a reality in the 1920s, sights were set on the transmission of both filmed and live moving pictures.

But progress toward that goal had been very slow in coming. The materials and technologies needed to transmit realistic-looking images simply did not exist. Willoughby Smith's report in 1873 that the electrical resistance of a bar of se-

lenium changed when the bar was exposed to light was a pivotal event. Soon, various individuals developed optimistic proposals to use this property of selenium to convert images into electrical signals.

Almost all the proposals involved creating an array of tiny selenium elements, insulated from one another, to mimic the way that the rods and cones of the eye send an electrical image to the brain. One major problem with this approach was that a separate wire was needed to connect each selenium element in the array to a corresponding element in some type of an image-producing array at the distant location where the object was to be viewed. A very complete summary of these early proposals is included in Albert Abramson's excellent book on the history of television [1].

It soon was realized that some means of "scanning" the image to be transmitted was needed. Scanning consists of sequentially converting portions or "elements" of the image into electrical signals and then transmitting the signals in proper order using only one pair of wires. The image elements must then be reassembled in proper order at the receiver.

Mechanical Scanning Methods

The first proposed scanning methods used complex mechanical mechanisms. In 1880, Maurice LeBlanc suggested a scanning system based on a pair of mirrors that vibrated in a carefully controlled manner. The mirrors were configured so that, at any given instant of time, they reflected the light from only a very tiny portion of the image to be transmitted. This reflected beam of light was then directed to a single light-sensitive cell that produced an electrical current directly proportional to the intensity of the reflected light. Similar scanning techniques were proposed by others [1].

In 1884, Paul Nipkow in Germany proposed a scanning system that would become the basis of most image transmitting designs until the 1930s.



The typical mechanical television set of 1928 was very large, but produced only a small image. Note separate loudspeaker.

Interestingly, while Nipkow obtained a patent on his proposal for an image transmitting system, he never built a working model. (It should be noted that the term "television" was not used until approximately 1900 [2].)

Nipkow's proposed scanning system employed a rotating disk with 24 small holes arranged in a spiral at the outer edge of the disk. Each of the rotating holes sequentially defined a separate portion or element of the image to be transmitted. The beam of light from the image element aligned with the hole at a particular instant of time was focused with lenses onto a selenium cell.

Nipkow proposed using a similar, synchronized rotating disk at the receiver in conjunction with a modulated polarized light source. The electrical signal from the transmitter controlled the plane of polarization of a Faraday-effect cell at the receiver through which the polarized light was passed. This arrangement effectively varied the intensity of the light at the receiver in proportion to the intensity of the light from the portion of the image that was being scanned at that instant by the transmitter disk [1, 3].

The scanning process substantially reduced the number of wires needed to connect the transmitter to the receiver but introduced some serious new problems. These new problems have been discussed by the author in some detail in an earlier article [4]. However, they will be briefly summarized again here.

Scanning at a fast rate is necessary if moving images are to be transmitted with good resolution and without blur. However, with mechanical scanning systems of the types proposed by both LeBlanc and Nipkow, faster scanning rates result in less light from a particular picture element falling on the photosensitive selenium cell.

This reduction in light, together with the slow response time of selenium, resulted in a smaller change in the electrical signal being produced by the photosensitive cell. While Lee de Forest had invented the triode vacuum tube in 1907, effective electronic amplifiers to boost weak signals did not exist until somewhat later. These constraints severely limited the maximum rate at which scanning could occur as well as the brightness of the images generated by early mechanical television systems.

Initially, the images produced by the Nipkow disk receiver were very small. Disks two feet in diameter at both the transmitter and receiver

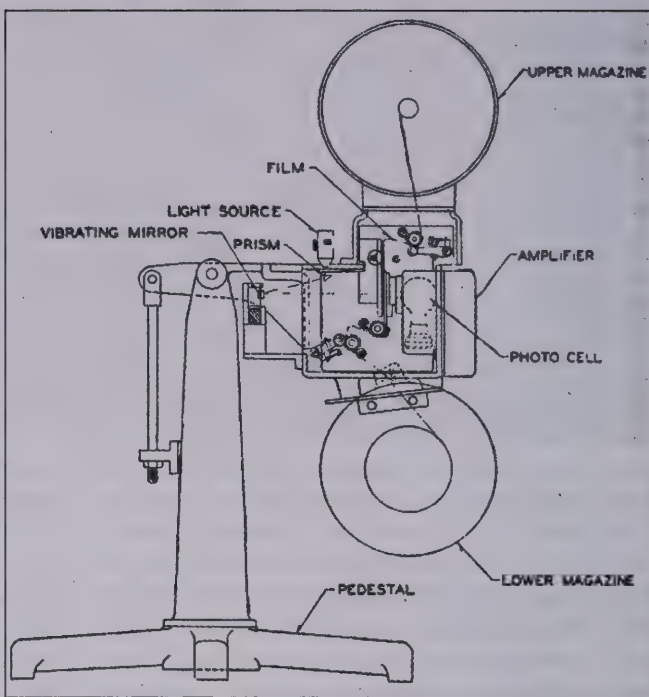


Diagram of the modified motion picture film projector Zworykin used to produce the TV images for his 1929 demonstrations.

were needed to produce a 48 scanning line image which was only about one and one-half inches square. The image could be viewed only by one person at a time, often through a telescope eyepiece. A projection system involving magnifying lenses and mirrors later was developed to enable several persons to view the image simultaneously. Unfortunately, the more the image was magnified, the more its brightness and sharpness were diminished.

The very nature of mechanically scanned television resulted in constraints that limited its future even after vacuum tube amplifiers were developed. Greater rotational speeds resulting in faster image repetition rates were required to prevent flicker and blur. More holes spaced farther apart around the Nipkow disks were required to achieve greater image resolution and image size.

A minimum of 240 scanning lines are required if the image being transmitted has a substantial amount of detail. The complete scanning process of a stationary object has to be repeated at least 15 times per second to avoid objectionable flicker when the image is viewed at the receiver. Even higher scanning repetition rates are necessary to prevent blur if the object being scanned is moving rapidly [5].

The result was that to produce even a six inch square unmagnified viewing image comprised of 240 scanning lines with a repetition rate of 20

images per second would require transmitting and receiving scanning disks almost 40 feet in diameter rotating at a rate of 1200 rpm. Clearly, mechanical scanning did not lend itself well to a home television viewing system.

Rozing Introduces a CRT Receiver

Prior to 1911, A.A. Campbell-Swinton in Britain, Boris Rozing in Russia, and others knowledgeable about the subject realized, for the reasons outlined above, that mechanical scanning was never going to lead to a truly practical, high quality television system. They proposed and/or began working toward all-electronic television systems utilizing beams of electrons to accomplish the scanning. Electrons, with their almost negligible masses, did not have the fundamental, inherent limitations of rotating discs and vibrating mirrors [6, 7, 8].

Vladimir Kosma Zworykin studied under Boris Rozing while a student at the Institute of Technology in St. Petersburg, Russia. He worked as Rozing's laboratory assistant and began what would turn out to be a lifelong interest in developing all-electronic television systems.

Rozing's major achievement was the use of a cathode-ray tube to display the received image. However, the transmitter Rozing built still used a complicated system of mechanically rotating octahedral drums with mirrors on their surfaces to direct the light beam from the element of the image being scanned to a photoelectric cell [4].

After graduating in 1912 with an engineering degree, Vladimir Zworykin went to Paris to study theoretical physics. With the advent of World War I, he returned to Russia to serve in the Tsar's army. The conditions produced by the subsequent Russian Revolution convinced Zworykin that he needed to leave the country.

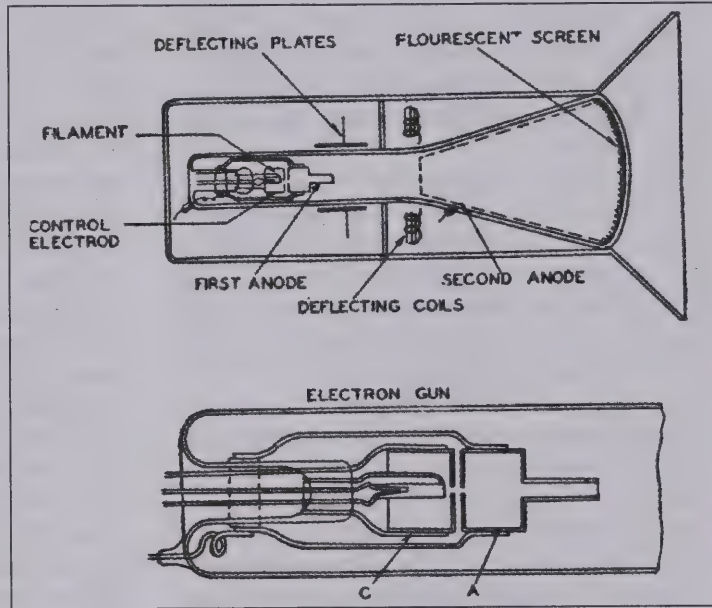
First Steps Towards an All-Electronic System

In 1919 Zworykin came to live in the United States and establish a career. Before long, he got a job with Westinghouse in Pittsburgh. By early March of 1923, Zworykin had established his credentials as a brilliant scientist and engineer in the development of improved photocells. The Westinghouse management now gave Zworykin permission to work on what was still his principal area of interest: the development of an all-

electronic television system free from the constraints of mechanical scanning [9].

By April 4, 1923, Zworykin had completed a conceptual design for such a system. But since he was required to work on projects which were likely to generate more immediate revenues, Zworykin was not able to devote much time to his proposed television system. Nonetheless, Westinghouse attorneys submitted a patent application on Zworykin's concept in late December of that year.

In addition to carrying out his other work-related responsibilities, Zworykin managed to assemble a very crude prototype of the television system he envisioned and demonstrated it to his



A 1929 drawing showing the details of Zworykin's Kinescope CRT.

supervisors. He reported much later that this demonstration occurred "toward the end of 1923" [10]. Another source reports that the demonstration was not given until 1925 [11]. Considering the amount of time Zworykin probably needed to prepare this demonstration, the later date seems more probable.

Regardless of when the event occurred, the inventor admitted that this initial demonstration was "scarcely impressive." The image televised was a cross projected on the target of the camera tube he had developed. A similar image but with quite low contrast and very poor definition appeared on the fluorescent screen of the receiver's cathode ray tube [10]. This demonstration television system was not totally electronic since it employed special motor generators to produce the deflection currents used in the camera [11].

The demonstration did succeed in showing the soundness of Zworykin's basic concept.

However, it also showed the tremendous engineering improvements that needed to be made in the various components of the apparatus before a useful television system would be achieved [10]. Zworykin was pleased with the demonstration but the Westinghouse executives were not. They thought that Zworykin should be working on something "more useful" [11].

Other individuals and groups, in both the U.S. and in Europe, were also working on the development of practical television systems. Zworykin realized this, and by June, 1924 he was able to convince Westinghouse to allow him to devote more time implementing his plans for an all-electronic television system. Initially, however, he received only a very modest amount of assistance and funding for this project.

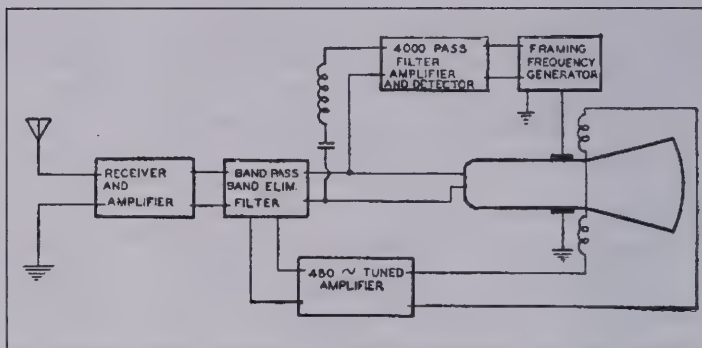
Building a sophisticated version of Zworykin's proposed television design required the use of much technology which did not then exist. Cathode-ray tubes (CRTs) were to be the heart of both his television camera and receiver. Because no suitable CRTs existed at the time, Zworykin had to design his own.

Techniques for creating a good vacuum, producing reliable glass-to-metal seals, and depositing thin layers of photoconductive materials on insulators had to be developed. These processes required as much art as they did science and they would take time to perfect. Zworykin also had to design and build the amplifiers, power supplies and electronic scanning circuits he would need. Not surprisingly, progress toward his goal of developing an all-electronic television system did not come rapidly.

During this period, Zworykin was also working on Westinghouse projects dealing with the recording of sound on motion picture film and with the development of facsimile systems for the transmission of still images. These projects actually had much in common with his television goals and were not total distractions from this work.

Zworykin's Research Flourishes Under Sarnoff

Following World War I, the U.S. Government had encouraged and chartered formation of the Radio Corporation of America (RCA) from the old British controlled American Marconi Company. The purpose of this action was to ensure that U.S. military and government radio communications would not be under foreign control.



A 1929 block diagram of Zworykin's Kinescope TV receiver.

The formation of RCA turned out to be of immense benefit to Zworykin and his work.

Part of the charter that established RCA called for the creation of a consortium of the major U.S. electronics companies. This consortium included General Electric, AT&T and Western Electric as well as the newly created RCA. Ultimately Westinghouse and other companies would become part of the consortium. The charter and subsequent agreements provided for initial ownership of RCA to be in the hands of General Electric and the already existing U.S. electronics companies. It also provided for the cross-licensing of patents and other sharing of expertise among the consortium members for a period of ten years.

By 1927, tentative plans had been made for RCA to acquire parts of the GE and Westinghouse radio facilities and staffs. As a result, Zworykin's work gained the attention and support of David Sarnoff. Long a believer in the future of television, the hard working and ambitious Sarnoff had become vice president of RCA by the time he was 31 years old. A meeting between Zworykin and Sarnoff in early January of 1929 resulted in Sarnoff providing several top-rate technical staff persons as well as the money Zworykin needed to expedite his project. Before the end of that year, Zworykin would be working for RCA.

Both Vladimir Zworykin and David Sarnoff saw television as a means of bringing information and entertainment to the home. Both clearly understood that a television receiver would not be readily accepted for home use if its operation required technical skill. Of course this constraint did not apply to the operation of the television camera or transmitter. There would be no problem in providing highly trained operators at a television broadcasting station [12].

The Kinescope Receiver is a Practical Reality

The first truly noteworthy illustration of

Zworykin's progress came on May 10, 1929 when he demonstrated his "Kinescope" CRT-based television receiver to a small group of Westinghouse technical people at the company's research laboratories in Pittsburgh. (The word "Kinescope" comes from the two Greek words "kineo" meaning "to move" and "scope" meaning "to observe" [9, 13].)

Zworykin had not completed development of his CRT-based television camera at that time. To generate a television signal for this demonstration, he substantially modified a standard 35mm motion picture projector to provide electronic scanning of the film [11].

In a normal motion picture projector, the film advances intermittently producing a sequence of 24 still images per second that the eye perceives as continuous motion because of a physiological phenomenon known as "persistence of vision." The standard film advancing mechanism was modified in the projector used by Zworykin so that the film moved continuously and at a slower speed of 8 frames per second. This continuous movement of the film provided the vertical component of the scanning process.

A light beam from an ordinary 6-volt automobile lamp was focused onto a mirror oscillating about a vertical axis at the rate of 480 times per second. This caused the light beam to sweep horizontally across the film at that same 480 Hz rate and produced the horizontal component of the scanning process. After passing through the film, the light beam struck a photoelectric cell that transformed the changes in optical density of the film into a varying electrical current [9, 12]. This arrangement produced 8 scanned images per second, each comprised of 60 scanning lines.

Zworykin's CRT Design

The CRT used in the Kinescope receiver was specially designed to provide the necessary deflection of the electron beam as well as sufficient and variable image brightness. Ordinary CRTs at the time did not have a means for varying image brightness. Existing high voltage CRTs which could produce an image of adequate brightness required that vacuum pump be continuously connected. This made them impractical for use in a home television receiver. The low voltage CRTs then available did not need a vacuum pump but could not produce an image of sufficient brightness for home viewing.

A new type of CRT was designed by Zworykin especially for television viewing. The picture area of his first tube was 5 inches in diameter. But before long he was building Ki-

nescope tubes with diameters as large as nine inches. The seven-inch tube Zworykin used in his initial television demonstration displayed a reproduced image approximately 4.25 x 5.0 inches.

After electrons were emitted by an oxide-coated filament in the neck of the Kinescope, they were collimated into a narrow beam. The electrons were then accelerated by a potential of 300 to 400 volts applied to the first anode. Following this initial low voltage acceleration, the electrons were deflected both horizontally and vertically by a pair of magnetic deflection coils and a pair of electrostatic deflection plates, respectively. The magnetic and electrostatic deflection fields acted on relatively slowly moving electrons. Hence, the field strengths required were much less than if the electrons had been initially accelerated through a higher voltage [12].

After the horizontal and vertical deflection, the electron beam was further accelerated by a voltage of 3000-4000 applied to a second anode. This anode took the form of a metallic coating on the inside of the Kinescope's glass bulb. The second anode also focused the electron beam into a sharp spot on the fluorescent viewing screen of the Kinescope. The screen was created by coating the end of the Kinescope tube with a fluorescent material such as zinc orthosilicate (also known as "willemite") [5, 12].

The brightness of the spot produced by the Kinescope's moving electron beam was controlled by placing a control electrode with a negative dc bias voltage near the cathode. This negative bias



The inventor and his Kinescope tube.

controlled the average brightness of the spot produced. Superimposed on the control electrode bias was the amplified video signal from the transmitter. The result was that the intensity of the moving spot of light at a given instant varied in proportion to the intensity of the point on the image being scanned at that same instant.

To produce a satisfactory image, the control of the brightness had to be a linear function of the video signal. In addition, it was necessary that this variation in intensity not upset the sharp focusing of the beam. Yet another requirement was that the control of the brightness must not significantly affect the velocity of the electron beam. This was necessary because the horizontal and vertical deflection of the beam is inversely proportional to beam velocity. A slight change in beam velocity would make bright lines shorter and dark lines longer. As a result of Zworykin's careful design, variation in velocity of the electron beam (from full brilliancy to complete cut-off) produced no discernable effect in the quality of the image produced [5].

Synchronization Issues

Proper synchronization of the Kinescope receiver image with that produced by the transmitter was achieved fairly easily. Horizontal synchronization was achieved by transmitting the

480 Hz voltage being used to control the scanning mirror at the transmitter. This signal was amplified at the receiver and applied to the horizontal deflection coils of the Kinescope CRT. The Kinescope's electron beam then precisely followed the horizontal movement of the scanning light beam across the film.

Vertical synchronization, or framing, was achieved by having the transmitter generate a sequence of properly timed voltage pulses. These pulses were transmitted concurrently with the picture signal and controlled the electronic generation of a linear saw-tooth voltage at the receiver.

The saw-tooth voltage was applied to the vertical deflection plates of the Kinescope CRT causing the electron beam to be deflected gradually and at constant speed from the bottom to the top of the fluorescent viewing screen. The vertical synchronization pulse generated by the transmitter caused the Kinescope beam to return to the bottom position of the screen, ready to start upward to reproduce the next image [12].

In Zworykin's demonstration of May 10, 1929, three wires were used to transmit the video signal and the two synchronization signals from the transmitter to the Kinescope receiver. A method for combining these three separate signals into one composite signal was soon developed.

The creation of a single, composite signal now made it possible to transmit the television images by radio. On August 17, 1929, Zworykin demonstrated radio-transmitted television pictures to a group of General Electric and RCA engineers. [1, 9].

Shortly thereafter, the inventor began experimental, late night broadcasts of television images three times a week using the Westinghouse transmitter. He kept one of the seven Kinescope receivers then in existence at his home to monitor the broadcasts. By this time, the television pictures were being scanned at the rate of 12 complete images per second but they still consisted of only 60 lines of definition [1, 9].

The Kinescope system was significant because it comprised the first totally electronic television receiver. Gone were the objectionable, whirling Nipkow disc and its associated motor. While the 60-line definition of the image did not provide high image resolution, it was clear that improving the resolution would not be an insurmountable problem. The images produced by Zworykin's Kinescope were considerably larger and brighter than those produced by mechanical television receivers. There were no inherent reasons why the Kinescope image size and brightness could not be increased even more.

(continued on page 58)



Zworykin demonstrating his Kinescope TV receiver in 1929.

STATION SAQ MAKES UNESCO WORLD HERITAGE LIST

On July 2, 2004, radio station SAQ in Grimeton, Sweden was added to the Unesco World Heritage List. SAQ operates the only remaining pre-electronic transatlantic transmitter—a 200 kW Alexanderson Alternator. This machine is the only one left of the approximately twenty 200 kW units originally manufactured by General Electric. The UNESCO committee, at a meeting held in Suzhou, outside Shanghai, in China, dubbed the station “an exceptionally well-preserved monument to early transatlantic wireless communication.”

Built 1922-24 and located about ten kilometers east of Varberg, the station is maintained in perfect operating condition. On July 4, designated “Alexanderson Day” to honor Ernst F.W. Alexanderson, the Swedish inventor of the equipment, SAQ transmitted a celebratory message on 17.2 kHz. Although this was a special transmission, the station makes a practice of operating each year on Alexanderson day. It can usually be copied in Europe and on the east coast of the USA.

The station’s six 127-meter antenna masts were the tallest structures in Sweden when they were in-



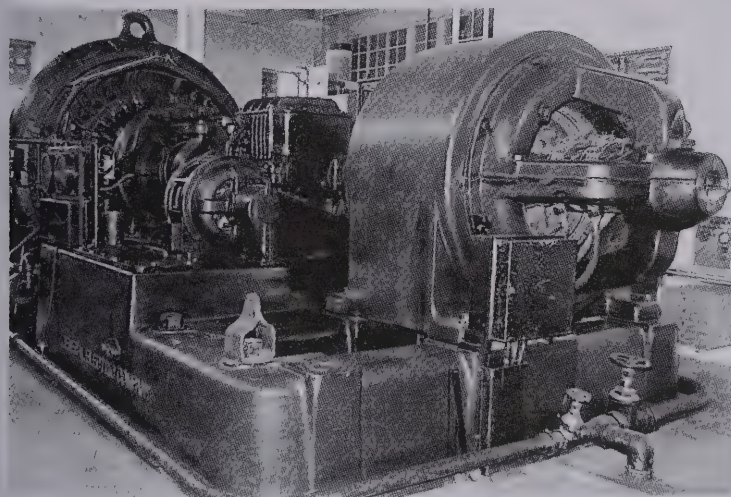
The transmitter building at Grimeton. Two of the six 127-meter antenna masts are visible.

stalled. Each has a 47-meter crossarm to carry the array of twelve wires that feed energy into the six vertical radiating elements.

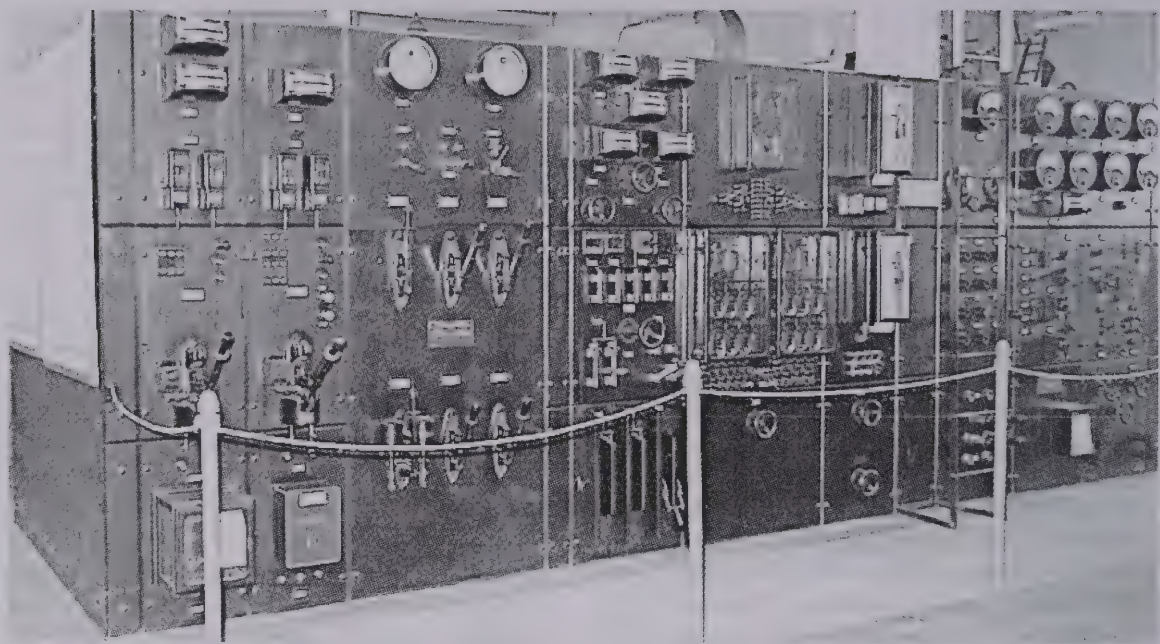
The station was built, at the direction of the Swedish Parliament, in order to establish more reliable telegraphic traffic with the United States. The problems with existing transatlantic communications had been made appar-

ent by the events of World War I. The location of the station was chosen to provide a propagation path to New York that would be completely over open water. The first message from SAQ was sent to Radio Central at Rocky Point, Long Island in October, 1924.

The facility was in continuous use from 1924 until 1947. During World War II, the it was indispensable in maintaining communications with other countries after cable traffic was cut off. After its 1947 retirement, SAQ was kept in operating condition, as a spare




SAQ's 200 kW Alexanderson alternator.



Transmitter control panels at SAQ.


transmitter for submarine communication.

The station is open to visitors. To learn more about it, see *AWA Review* Vol. 3, 1988. You might also visit www.alexander.n.se/ and click on the British flag for a list of articles available

in English. To see the UNESCO World Heritage list and find out how it is administered, go to whc.unesco.org/pg.cfm?cid=31. Scroll down to "Sweden" and click on "Varberg Radio Station" for a short article about SAQ. 

ZWORYKIN, *continued from page 56*

The concepts behind the Kinescope's operation were fundamentally very sound. Present day analog television receivers utilize the same basic technological principles established by Zworykin nearly 80 years ago. Vladimir Zworykin's work was not done. He still needed to complete the development of a companion, all-electronic television camera. Part II of this article will describe that work and its results.

Author's Note: All illustrations are courtesy of the David Sarnoff Library, Princeton, NJ. Particularly helpful in obtaining the illustrations was Dr. Alexander B. Magoun, Executive Director of the Library. 

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NEW BOOKS AND LITERATURE



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PLEASE INCLUDE SASE FOR REPLY.

Books to be reviewed in this column should be sent directly to David Krauter at the address above. After review, all such books become a permanent part of The AWA Library, which is part of The AWA Electronic Communication Museum and is available to members for browsing and research.

Television and Me

By John Logie Baird. Malcolm Baird, editor. (Revised and expanded edition; earlier editions published in 1988 and 1990). Published 2004 by Mercat Press Ltd., www.mercatpress.com, 6 x 9 1/4 inches, 148 pages, softcover, \$9.99.

One might think that Russell Burns' 417-page *John Logie Baird: Television Pioneer* and Antony Kamm and Malcolm Baird's 465-page *John Logie Baird: A Life* would say about all that needs to be said about Baird. But this publication of Baird's updated autobiography is a happy event for two reasons: first, it's always best to get your information from a primary source, if possible, and second, Baird provides some insights into his life and work that his biographers did not include.

For example, on page 54 Baird writes:

The ideas regarding television in 1925 are

surprising today when television is taken as a matter of fact, and the method by which it is accomplished is also now regarded as the obvious method. In 1925 it was not so. In fact it was the very reverse.

These are telling words from the man who invented television using spinning cardboard discs and wound up producing the world's first cathode ray color picture tube.

Baird's frank descriptions of his attempts to enter the business world prior to his work on television are, in places, hilarious. For examples, see his descriptions of making guava jam in the Caribbean or his experiences with the Baird Under-sock and "pneumatic" walking shoes. What would he think of today's walking shoes with compressed air in the soles?

Baird wrote with candor and good humor throughout his autobiography, so it is doubly dis-

A NOTE ON OUT OF PRINT BOOKS

The three books reviewed in this column are readily available from their publishers, but some books we have reviewed in the past are out of print. In the old days, *out of print* meant "no longer for sale". Then, with the proliferation of used book dealers, *out of print* came to mean "no longer for sale by the publisher, but possibly available through a used or rare book dealer somewhere". At that point there usually ensued a lengthy and frustrating search by mail and/or telephone. Today, however, *out of print* generally means "probably available through the Internet".

Here are a few Internet "out of print" book suppliers who, along with the well-known www.amazon.com provide commercial access to millions of OP titles:

www.abebooks.com

www.addall.com

www.amazon.ca (as opposed to .com)

www.antiqubook.com

www.barnesandnoble.com

www.bookfinder.com

www.trussel.com/f_books.htm

www.usedbookcentral.com

www.usedbooksearch.co.uk

Even the seemingly-obscure 1869 Morse book footnoted here is available through at least one of these online vendors.

What is to be done when the book you want cannot be found on the Internet? Just take yourself to your local public library and find the Interlibrary Loan department. They will be able to borrow books for your temporary use from thousands of other libraries whose holdings are listed in the vast Online Computer Library Center (OCLC) database (54 million unique titles and counting).

Thanks to Roger Hart of Old Authors Bookshop who reminded me that www.amazon.com isn't the only online player in the used book game. You can browse Roger's book shop at www.oldauthors.com.

appointing that he omitted his thoughts and feelings at the time he abandoned mechanical television for a cathode ray system.

He was an electrical innovator of the first rank. This fact does not prevent his life from being read as a study in frustration and perseverance. While continually inventing he saw his way through many personal and professional setbacks, until finally he was poised for success with his various companies and held a monopoly on color television. Unfortunately he arrived at this position in 1939.



Lightning Man: The Accursed Life of Samuel F. B. Morse

By Kenneth Silverman. Published 2003 by Alfred A. Knopf, www.aaknopf.com, 6½ x 9½ inches, 503 pages, hardcover, \$35.00.

Even though Morse's simple device of wires, switches and electromagnets used low-voltage batteries¹, he became known as "Lightning Man" because of the conflation in the public's mind of equally-mystifying lightning and electricity.

Silverman does not explain the phrase "accursed life" from the subtitle of his book. He has no need to. Morse struggled his entire adult life trying to establish and maintain his reputation—first as a portrait painter and then as an inventor. Like many successful inventors before and since, Morse became a nexus of insight, ambition, wealth and ego. He was not entirely likeable.

Driven (and tainted) by his early strict religious training, he came to hate Catholics and see Catholicism as an attempt to undermine the American government. He thought he found Biblical evidence that condoned slavery and published tracts in support of it. He neglected his children for his work and sometimes failed to give his associates in invention proper acknowledgment for their contributions.

Morse's life and struggles remind us that invention and people's reaction to it could be just as unsettling and rancorous in the 19th century as it was in the 20th. Feelings for and against Morse ran high, even after his death in 1872. A life-size statue of him remains today in New York City's Central Park. But Amanda, the widow of Morse's closest colleague in invention, Alfred Vail, spent most of her adult life trying to gain recognition for Vail's telegraph work and weaken Morse's.

Did Morse invent the telegraph? You might as well ask if Marconi invented the radio². But, as Silverman shows, Morse, like Marconi, got his

system together in working order, patented it, made it available in usable (i.e., commercial) form, and continually demonstrated its value. Morse's system was also able from the beginning to record transmitted information, unlike the needle telegraph of Cooke and Wheatstone, which Morse referred to as a "semaphore"³.

The world is indebted to writers like Silverman who are willing to devote years of research, thought and writing to the production of biographies such as this thoroughly readable one.



Index to AWA Publications "2004-1/2 Issue"

By Ludwell Sibley. Published 2004-1/2 by the editor, (102 McDonough Road, Gold Hill, OR 97525) or PayPal to tubelore@jeffnet.org, 5½ x 8½ inches, 90 pages, softcover, \$12.00.

Only Lud would subtitle his monumental 8,000+ entry index with a "numerical acronym." These 90 pages at once make your OTB and AWA Review collections double their value by providing ready access to the information in them. Also included are entries for Tube Collectors Group *Fact Sheets*, the *Fifty Years of AWA* booklet and other AWA publications, January 1960 through 2004-1/2. If you know it's *somewhere* in one of these, you should be able to quickly find exact volume, issue and page numbers using this classified index. All AWA diehards will want this one.



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¹ Morse telegraph systems operated with about 48 volts. See S.F.B. Morse, *Paris Universal Exposition, 1867. Reports of the United States Commissioners. Examination of the Telegraphic Apparatus and the Processes in Telegraphy*, Washington, DC: Philp & Solomons, 1869, p. 71.

² For more on Morse's telegraph predecessors, see the February 2002 OTB, pp. 64-5.

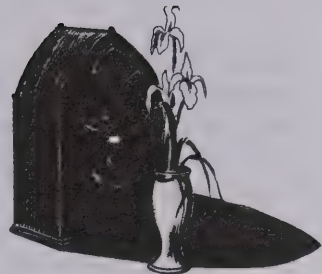
³ Morse, *op. cit.*, p. 147.



RECENT RADIO, TV AND ENTERTAINER OBITUARIES

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Note: When known, the date of death is indicated in parenthesis.

CHARLES E. ANDREWS, 88, (7-2-04) television producer and writer. Andrews was a writer in the early years of television and helped originate what historians call the "Chicago school of television." This approach to television sought to rely on the unique properties of the new medium, often airing programs live, sometimes from a warehouse, using little or no scenery. Andrews wrote for Dave Garroway whose variety show, *Garroway at Large*, originated in the Chicago studios of NBC's WNBQ (TV) from 1949 to 1951. He continued to work for Garroway when he moved to New York City to host the *Today* program in 1952. Andrews also wrote for Studs Terkel and Sid Caesar. He produced *The Arthur Godfrey Show*, *Candid Camera*, *The Steve Allen Show* and specials like the Emmy Awards and the Miss USA and Miss Universe contests. Andrews retired in 1985.

MARLON BRANDO, KE6PZH & FO8GJ, 80, (7-1-04) actor. Brando was best known for his film roles as Stanley Kowalski in *A Streetcar Named Desire* (1951), a dockworker in *On the Waterfront* (1954) and Vito Corleone in *The Godfather* (1972). He won Oscar Awards for his performances in the latter two productions. At times he was eccentric and outspoken but his acting skills were envied by generations of actors who followed him. Brando's "...mix of savagery and sweetness, vulnerability and danger, defined a new style of acting and set an indelible standard for a particular brand of manhood." He appeared in about sixty films in a career that stretched from *The Men* (1950) to *The Score* (2001). Brando also performed on stage making his Broadway debut in *I Remember Mama* (1944) followed by *Truckline Café* (1946), *A Flag is Born* (1946), *Candida* (1946) and *A Streetcar Named Desire* (1947). His first television appearance was on *Actors Studio* (ABC) in 1949. Other TV credits include *Roots: The Next Generations* (ABC 1979-1981), *The Ed Sullivan Show* (CBS 1955-1956) and *Saturday Night*

with *Connie Chung* (CBS). He received an Emmy Award for his performance in *Roots: The Next Generations* in 1979.

RAY CHARLES, 73, (6-10-04) pianist, singer and composer and conductor. Charles was "one of America's greatest singers and a musician who brought the essence of soul to country, jazz, rock, standards and every other style of music he touched." Some of the varied selections he sang included *Hallelujah I Love Her So*, *I Can't Stop Lovin' You*, *Georgia on My Mind* and *America the Beautiful*. Charles first national hit was "I've Got a Women" recorded in 1955. His recording of *Georgia on My Mind* in 1960 became a No. 1 hit and brought him the first of twelve Grammy Awards. Charles recorded over 60 albums. His television appearances include *Designing Women* (NBC), *Moonlighting* (ABC), *Three's Company* (ABC) and *The Carol Burnett Show* (CBS). He also conducted The Ray Charles Orchestra on *The John Byner Comedy Hour* (CBS 1972) and the Ray Charles Singers on *The Perry Como Show* (CBS and/or NBC 1950-1963). Charles, who was completely blind by age six, left school at age 15 and began playing with various bands in Florida.

JOHN R.T. DAVIES, 77, (5-25-04) audio engineer. Davies remastered vintage jazz records in an attempt to achieve the sound quality the musicians had intended. Using a number of techniques, some of his own making, he was able to reduce the clicks, pops and scratches so common to 78 rpm recordings. In his remastering efforts he also tried to correct pitch problems caused by the frequently flawed recording equipment used during the 1920s and 1930s. Because of the time required, most of his work was done for small specialty labels in Great Britain, Canada and the Netherlands. The larger record companies were more cost conscious. During the 1960s Davies, a self taught musician, played with the Temperance Seven who had a number of recordings that made the British pop charts.

BYRON H. "BY" GOODMAN, W1DX, (ex-W6CAL and W1JPE), 93, (5-11-04) technical

editor. Goodman was a staff member of the American Radio Relay League for more than thirty years. There he authored and edited hundreds of *QST* articles and columns as well as other League publications, including *The Radio Amateur's Handbook*. Goodman is credited with his pioneering efforts to promote the use of single sideband (SSB) by amateur radio operators through a series of columns in *QST*. The first, "What is Single-Sideband Technology?" was published in the June 1948 issue. Goodman also reviewed equipment and served as the first "How's DX?" editor from 1936 until 1947. He began his career at the League as an Assistant Secretary in the mid-1930s. In 1989 Goodman received the Dayton Hamvention's Technical Excellence Award.

DONALD L. HINGS, VE7BH, 96, (2-25-04) electrical engineer. Hings was the inventor of the "walkie-talkie" radio that revolutionized battlefield communications during WWII, although he never claimed that distinction. He designed the portable field radios in 1937 while employed by the Consolidated Mining and Smelting Company of Canada (now Cominco) in Vancouver, B.C. They were intended to provide communications for bush pilots flying in remote areas of Canada. Hings was loaned to the National Research Council (1940–1945) to develop military communications, including the military version of the walkie-talkie (Model C-58 Pack Set). He was President and Chief Engineer of Electronics Laboratories of Canada Ltd. (1946–1985) which designed radar and antennas for the Canadian military. Hings received 50 patents for inventions related to the thermionic vacuum tube, a Doppler radar aircraft-landing system and sub-sea geomagnetic instruments for exploration of minerals. He received the Order of the British Empire in 1946 and the Order of Canada in 2001.

MARV HOWARD, 72, (6-26-04) newscaster. Howard was heard on KMPC (AM) in Los Angeles during their morning drive-time show from 1982–1994. From 1977–1982 he did the news at KFI (AM). Many listeners remember him best as a newscaster at KHJ (AM) from 1963–1977 where he provided a contrast to the top-40 music and the station's "on air" personalities such as "The Real" Don Steele, Sam Riddle, and Charlie Tuna. After Howard's discharge from the Air Force he attended the Don Martin School of Broadcasting and, upon graduation, became a disc jockey at KBIS (AM) in Bakersfield. Later

Howard was heard on stations in Los Angeles, San Bernardino, and Burbank before joining KHJ in 1963. He retired from radio in 1994 and did voice-over work.

BRIAN LINEHAN, 58, (6-4-04) television personality. Linehan was the producer and host of the celebrity show *City Lights* heard in Canada and syndicated in the U.S. around the world. His "...meticulous research and in-depth questioning gave him a reputation as an interviewer par excellence." Linehan was associated with the show from 1973, when it began on the Citytv channel in Toronto, until it ended in 1989. During that time he interviewed more than 2,000 guests including Helen Hayes, Burt Reynolds and Barbara Streisand. This was followed by conducting star interviews for Hollywood movie studios, a number of TV appearances and then *Linehan*, a 1997 interview series on WIC and WTN, the Women's Television Network. Linehan hosted the Academy of Canadian Cinema and Television's Genie Awards in 2001 and 2002 and was a presenter in 2003. He received their Gemini Award in 1999 for best host of a lifestyle or performing arts program, *Linehan*.

IRENE MANNING, 91, (5-28-04) actress and singer. Manning, a lyric soprano, appeared in a number of musicals during the 1940s including *Yankee Doodle Dandy*, *Shine on Harvest Moon* and *The Desert Song*. She starred with Humphrey Bogart in *The Big Shot*, a gangster film, in 1943. Manning began her film career in *The Old Corral* in 1936, starring Gene Autry, and appeared in several westerns before making her Broadway debut in *Susanna, Don't You Cry* (1939). During WWII she toured with a U.S.O. troupe and recorded four songs, in German, with the Glenn Miller Orchestra shortly before Miller died in 1944. Manning returned to Great Britain after the war to work onstage and had a BBC television show, *An American in England*. Returning to America she performed on *Window on the World* (Dumont 1949), toured and acted in regional theaters. Manning taught voice and acting into the mid-1990s and occasionally performed.

DR. RAYMOND V. PHILLIPS, 90, (5-9-04) educator. Phillips, a former University of Vermont dean, was responsible for the creation of Vermont Educational Television, forerunner of Vermont Public Television. In the mid-1960s he spearheaded the effort to establish educational television in the state as a means of providing

learning opportunities for those unable to get to classrooms. Phillips was also the founding Chairman of Vermont Public Radio in 1975 and was Chairman of the Board until the mid-1990s. Under his guidance it grew from one station to three. He served in the Navy as an armed guard commander during WWII. Phillips began his career as a principal of a junior high school after graduation from college in 1934.

BILL RANDLE, 81, (7-9-04) disc jockey, lawyer and teacher. During the 1950s and 1960s Randle became Cleveland's most successful and notable radio personality. Throughout his career he hosted radio programs on WERE (AM), WBBG (AM) and WRMR (AM) and, at one point, commuted to New York City to do a show on WCBS (AM). Randle also had a skill for recognizing No. 1 hits, discovering new talent and helping others develop their careers. In 1955 he predicted Elvis Presley "...is going to be the biggest star in America." A year later he introduced Presley on his first national TV appearance on *Stage Show* (CBS). Some of the other stars he assisted include Tony Bennett, Bobby Darin, Rosemary Clooney, Johnnie Ray and Fats Domino. Randle, who began his radio career in Detroit, was hired by WERE in 1949 but by 1961 he had grown tired of radio and turned his attention to attending college. The high school drop out earned six degrees and later taught communications and sociology at several universities and practiced law for the past sixteen years. From time-to-time he did return to broadcasting.

RONALD W. REAGAN, 93, (6-5-04) politician and actor. Reagan was the 40th President of the United States (1981–1989), Governor of California (1967–1975) and earlier performed in movies, television and radio. Toward the end of his term as President of the Screen Actors Guild (1947–1951, 1959) his political views changed from those of a liberal Democrat to a conservative Republican. This helped move his career from Hollywood to political ambitions. Reagan began his film career as a radio announcer in *Love Is in the Air* (1937) and concluded it in the *The Killers* (1964). In all, he performed in nearly sixty films. Some of the better known of these include *Knute Rockne All-American* (1940), *The Hasty Heart* (1950) and *Bedtime for Bonzo* (1951). Reagan made many notable guest appearances on television programs beginning with the *Nash Airflyte Theater* (1950) and concluding with *Biography* (1987). Some of the programs on which he appeared multiple

times include *The Orchid Award* (ABC 1953–1954), *Death Valley Days* (Syndicated 1965–1966), *The Ford Theater* (CBS 1948, NBC 1953), and *Schlitz Playhouse of Stars* (CBS 1951). Reagan was the host and star of *General Electric Theater* (CBS 1954–1962) and for many years was their spokesman visiting plants to talk to employees. It was during this period that he honed many of his political skills. Earlier he was sought after for guest appearances on radio programs including *The Cavalcade of America* (NBC), *The Colgate Sports Newsreel*, (various networks), *Hollywood Byline* (ABC), *The MGM Theater of the Air* (Syndicated) and *Warner Brothers Academy Theater* (Syndicated). Reagan completed college in 1932 and began work as an announcer at WOC (AM) in Davenport, IA and later moved to WHO (AM), an NBC affiliate in Des Moines, to cover sports. In 1937, while covering spring baseball training in Los Angeles, he visited Joy Hodges, a singer and friend, and indicated his desire to become an actor. She arranged for him to take a screen test and soon he was offered a contract by Warner Brothers.

ISABEL SANFORD, 86, (7-9-04) actress. Sanford starred as Louise Jefferson on *The Jefferson's* (CBS 1975–1985). In 1981 she became the first black woman to win an Emmy Award for best actress in a comedy series. She also appeared as Louise Jefferson on *All in the Family* (CBS 1971–1975) and made guest appearances on *Bewitched* (ABC), *The Carol Burnett Show* (CBS) and *Hearts Are Wild* (CBS 1992). In 1967 Sanford made her film debut in *Guess Who's Coming to Dinner?* starring Katherine Hepburn, Spencer Tracy and Sidney Poitier. Prior to this she had appeared in the Los Angeles and Broadway productions of *The Amen Corner*. Sanford grew up in poverty in Harlem but had ambitions of becoming an actress. During the 1930s she joined the Star Players and later the American Negro Theater and in 1946 made her stage debut in their production of *On Strivers Row*.

JACK L. SIEGAL, 75, (7-16-04) broadcast executive. Siegal was President and General Manager of Chagal Communications, Inc., a multi-media investment/consulting firm dealing in broadcast properties. It owned FM radio stations in Los Angeles including KJOI and KFOX. In 1970 Siegal moved to Los Angeles and put KJOI on the air, and then KLVE (1973) followed by other local stations, including KSRF. His most recent station was KFOX, providing Ko-

rean language programming. He began his radio career as a disc jockey and announcer while a student at the University of Pennsylvania. After college Siegal joined the Navy and became a radio combat correspondent covering the war in Korea. Afterward he was a reporter and director for Edward R. Morrow's *See It Now* program on CBS Television.

DR. ALFRED SOMMER, 94, (12-8-03) high-definition television pioneer. Sommer, a German-born chemist, immigrated to Great Britain and joined the staff of Baird Television Ltd. There he worked with John Logie Baird to develop color television with improved resolution. Baird began experimenting with a mechanical scanning system for television in the 1920s and in 1926 gave a successful public demonstration. (See "Eye of the World: John Logie Baird and Television," *OTB* 38-3-40, *OTB* 38-4-46 and *OTB* 39-1-29) Sommer relocated to the United States in 1953 to become affiliated with the group that developed the winning U.S. color television standard at the RCA Laboratories in Princeton, NJ. He retired from the research facility in 1974 and worked as a consultant to the Thermo Electron Corp. in Waltham, MA. Sommer was named an IEEE Fellow in 1960 for his contributions to the field of photo-emissive surfaces.

DR. THOMAS G. STOCKHAM, JR., 70, (1-6-04) digital electronics pioneer. Stockham began experimenting with digitization of sound soon after becoming an Associate Professor at M.I.T. in 1957. At that time the focus was on digital sound for communication purposes and not music. Eventually digital recording and sound systems replaced analogue technology allowing the transition from long-playing records to compact discs. In 1968 Stockham relocated to the University of Utah where he continued his research and established Soundstream, an audio business. In 1976 the firm made history with the release by RCA of "Caruso: A Legendary Performer." It was the first in a series of Caruso's early 20th century recordings to be digitally remastered by Soundstream. The firm, which sold professional digital editing systems, merged with Digital Recording Corporation in 1980. In 1994 Stockham received a Grammy Award for his "visionary role in pioneering and advancing the era of digital recording."

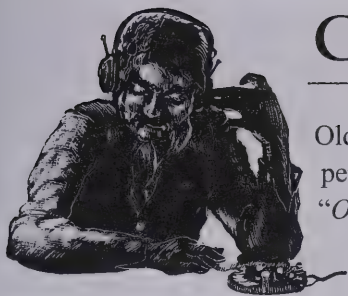
BERNARD V. VONDERSCHMITT, 80, (6-9-04) electrical engineer. Vonderschmitt worked in early semiconductor research and with two

partners founded Xilinx in 1984. The firm pioneered the business of separating chip design and manufacturing by producing a new class of semiconductor chips known as field programmable gate arrays. This process made it possible for companies to design innovative chips without having costly manufacturing plants. Vonderschmitt was employed by RCA for 34 years in various research capacities and in 1953 was selected to head the development their of electronic color television system. The National Television System Committee standard, which was developed by his group, remains in use to this day. He headed RCA's Solid-State Division from 1972-1979. In 1979 he moved to the Silicon Valley where he was in charge of Zilog's Component Division.

GENE WOOD, 78, (5-21-04) announcer. Wood was the announcer for a dozen or more television quiz/panel shows beginning with *Beat the Clock* (CBS 1969-1972) which he later hosted from 1972-1974. Some of his other quiz show credits include *Card Sharks* (1978-1981, 1986-1989), *Classic Concentration* (1987-1994), *Family Feud* (Syndicated 1976-1995), *Password Plus* (1979-1989), *Tattletales* (1974-1978) and *Win, Lose or Draw* (Syndicated and network daytime 1987-1990). He concluded his career as the announcer for the first season of the Family Channel series *Family Challenge* and later announced programs seen on the cable Game Show Network. Wood began his career as a writer first for comedian Milton Berle and later Bob Keesham, television's *Captain Kangaroo*.

Information for this column was obtained from *The AWA Review*, *The Big Bands* (4th ed.), *The Complete Directory to Prime Time Network and Cable TV Shows 1946-Present* (12th ed.), *Hartford Courant*, *The Old Timer's Bulletin*, *On the Air: The Encyclopedia of Old-Time Radio*, *QST*, www.academy.ca, www.broadcastingcable.com, www.cbc.ca, www.crosswinds.net, www.ecf.utoronto.ca, www.engineering.uttutoronto.ca, www.latimes.com, www.laradio.com, www.nytimes.com, www.rotaryclubofsantamonica.org, www.sitka.triumf.ca, www.soaps.about.com, www.theinstitute.ieee.org, www.thestar.com, www.topiclink.com, www.us.imdb.com and www.willereng.com.

Thanks to Keith Kunde, K8KK, Dr. E.E. Taylor and Dr. A. David Wunsch for additional source material.



CLASSIFIED ADS

Old-time ads are free to members collecting and restoring equipment for personal use. *OTB* classified ads are also available for browsing in the “*OTB On Line Edition*” on our Internet Web site (www.antiquewireless.org). Please observe the following: (1) include as SASE if acknowledgement is desired; (2) material must be more than 25 years old and related to electronic communications; (3) give your full name, address and

zip code; (4) repeats require another notice (we are not organized to repeat automatically); (5) the AWA is not responsible for any transaction; (6) we retain the right to reduce an ad's size if over seven lines; (7) AWA does not accept commercial advertising in this column; and (8) closing date is six weeks prior to first day of month of issue. Ads received after that time will be held for the following issue.

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SELL/TRADE—BC/SW TUBE RADIOS

Federal #200 drop-in radio, \$350.; Vogue record, \$50.; Blaupunkt wood radio, \$60., RCA 100-A speaker, \$75. Walt Wrabek, 10750 159th Ave., Menahga, MN 56464 (218) 564- 4623

SELL/TRADE—GENERAL

Lifetime collection of 300 broadcast radios including polished wood and Bakelite cabinets from the 1920s to 1960s; communications receivers. Also 720 books and 1500 service sheets. Pictures available. Richard and Ivana Birkett, 42 Halvarras Rd., Playing Place, Truro TR3 6HD, Cornwall, United Kingdom, phone and fax 004401872-862575

23 tube, 5 knob, Scott All Wave console in Windsor cabinet. Complete with 3 speakers, PS/Amp. and Tuner. Pickup only. Will not ship. You remove it from my basement. Has been stored for over ten years and untested since. Good condition with little pitting on the chrome. \$2,500. Larry Babcock, 8095 Centre Lane, East Amherst, NY 14051 (716) 741-3082 E-mail: DOTLARRYB@aol.com

Weston Industrial Circuit Tester Mod 758 w/HV adapter, manual, \$40.; RCA Type 2AP1 CRT w/socket, \$5.; 60 ea. crystals 2009 kHz to 34.73 mHz types FT-243, CR-18/U, \$1.50 ea or \$40 for all; WWII AN-431A folding antenna w/insulator base, \$15.; WWII RS-38A mike, \$10.; Weston RF ammeter Model 425, 0-1 amps, \$8.; also one 0-5 amps, \$8. SASE for list of Ham-

marlund, Pilot, etc. variable condensers, DC fil. rheostats, phone jacks, tube sockets, headphones, knobs, etc. mostly 20s and 30s vintage. Clarence F. Bauer, 1707 Guldahl Dr., Titusville, FL 32780 (321) 268-0916

1940 Lafayette E-90 BC/SW portable, \$25.; five battery set transformers, \$45.; Guild “Tea Kettle” radio, \$25. Jerry Talbott, 4403 NE Birdhaven Loop, Newberg, OR 97132 Tel. (503) 538-4041 E-mail: vinradio@easystreet.com

Vintage collection - 60 AC/DC radios of 1950s to 1970s, complete Radio-TV shop with instrumentation, large supply of parts back to the 1930s, amateur radio equipment, coils, capacitors, dummy loads, bleeders, transformers, chokes, sockets, power supplies, catalogs and manuals. Will sell at bargain price to one buyer. F. H. Yonker, W2IBH, 1229 N. Inverary Place, State College, PA 16801 (814) 867-1400 E-mail: yonker1229@adelphia.net

Bendix 2 way receiver/transmitter base station Model 1D650P with mike, \$75. plus UPS.; Two Motorola Twin V mobil transmitters; receiver Model T43GGV Type CC3012, 6V or 12VDC with mikes and control cables, etc., \$75. each. Phil Guinan, 106 Page Rd., Litchfield, NH 03052 Tel. (603) 889-6213 E-mail: philip1924@aol.com

Waterman Pocket Scope Mod S11A, \$35.; Zenith Mod 6D628 wood cabinet, \$35.; True-tone Mod D2611, \$20.; GE Mod T-230C, \$20.; GE AM/FM clock Mod C4510D, \$15.; West-

inghouse transistor Mod H9080, \$5.; Sylvania transistor Mod 4A19WD w/case, \$8.; GE Mod 408, \$20, GE AM/FM Mod T-210A, \$15.; Emerson Mod S210Z AM/FM stereo w/matching wood cabinet spkr., \$35.; All in good condition. Also have DX300 .01 to 30 MHz receiver w/manual/ schematics, not working, \$15. Clarence Bauer, 1707 Guldahl Drive, Titusville, FL 32780 Tel. (321) 268-0916

SELL/TRADE—LITERATURE

Third revised enlarged edition "Radio Troubleshooter's Handbook" by Alfred A. Ghirardi, a hardback in excellent condition, \$30. includes shipping, Bob Collins, 3251 W. Simkins Road, Pahump, NV 89060 Tel. (702) 727-5383 or E-mail: w6wby@usintouch.com

2004 index to AWA publications, \$12. 8000+ citations from all AWA sources. Indexed by subject and author. Handy 5½" x 8½" format. Ludwell Sibley, 102 McDonough Rd., Gold Hill, OR 97525, or PayPal to tubelore@jeffnet.org

QST magazines. Thirties through Century. Three to seven dollars. Request free contents pages. Charles Graham, 4 Fieldwood Dr., Bedford, NY 10507 (914) 666-4523

Manuals for Hallicrafters, Hammarlund, National, Globe/WRL, Heathkit, Allied/Knight, Johnson Viking, Elmac, Gonset, Eico, B&W, RME, Conar, B&K, Harvey Wells, Morrow, Lafayette, Mosley, Drake, Regency, Ameco, Clegg, Genave, Utica, Polycomm, Pierson, Davco, Archer/Realistic, Subraco, RCA, Simpson, Triplett, HP, Superior, Swan, Howard, Echophone, Millen, McMurdo Silver, Paco, Precision and more. Alvin Bernard, P.O. Box 690098, Orlando, FL 32869-0098 (407) 351-5536 E-mail: ni4Q@juno.com

British Radio & TV Mfr. history "The Setmakers," like new, hardbound, \$35.; also "Canadian Broadcast Radio History," \$15. Jerry Talbott, 4403 Birdhaven Loop, Newberg, OR 97132 phone (503) 538-4041 E-mail: vinradio@easystreet.com

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High voltage film (Orange Dip and Tubular Axial), silver mica, ceramic disc and electrolytic (both axial and radial) capacitors for tube radios. Send for price list. Dave Cantelon, 42 Clematis Rd., North York, Ontario, Canada M2J 4X2 (416) 502-9128 E-mail: justradios@yahoo.com or visit website: www.justradios.com

Galena crystal radios and parts to make your own. radio tubes, old and modern. Radio parts at very low prices. Len Gardner, 458 Two Mile Creek Rd., Tonawanda, NY 14150 E-mail: radiolen@att.net

WANTED—GENERAL

Audio amplifier from the 1950s or 1960s such as Bogen DB-20 or DB-10 or similar Bell or other makes with output 6V6s. Preferably with schematic. Condition unimportant. Charles Graham, 4 Fieldwood Drive, Bedford Hills, NY 10507 (914) 666-4523

Pilot 3" TV parts set. Charles Mooney, N3RQY, 13018 Midsummer Lane, Bowie, MD 20715-3030 Tel. (301) 464-1624 E-mail: charliemooney@webtv.net

Hickok 532 manual or copy; 6 volt #81 automotive bulbs as used in 532; Bliley VF-1 crystals. Geo. H. Goldstone, 1010 Burnham Rd., Bloomfield Hills, MI 48304 Tel. (248) 647-3399

Round wooden radios like the Wilcox Gay A-17, Claradyne and Silver 159 radios; also the Kaydette Topper radio; restorable speaker and chassis for the "Wheat" 414 Emerson radio; any Beetle plastic radio like Sonora TW-49; Firestone "Air Chief" S-7426-1 radio. Joseph CiCaro, 4155 Lastrada Heights, Mississauga, Ontario, Canada L5C-3V1 Tel. (905) 848-7759 E-mail: decoradio@primus.ca

Pre-war Raytheon or National Union radio dial bulb boxes, #40, 46, or 47. Contents optional, Fin Stewart "Cockerdale", 380 Bulga Rd., Wingham N S W 2429 Australia E-mail: ferrowatte.m.380@bigpond.com

National 7 inch TV set, Model TV-7M or TV-7W. Also need nameplate for Zenith R520/URR Military Transoceanic radio. It mounts on the front of a cabinet. Will pay well. Thanks! Charles Harper, 2000 Jackstown Road, Paris, KY 40361 (859) 484-9393 E-mail: charper@kyk.net

WANTED—INFORMATION

Manual or circuit for Zenith H503 Ser. No. J573859. Also would like photo of external case. Many thanks! Bill Gibson, GM0KMG, 180 Castlemilk Road, Glasgow, G44 4NS, Scotland

WANTED—LITERATURE

Manual for B&K TV Analyst Model 1076. Don-

Need any information including schematic for a Federal Tel. and Tel. Model 1422-W antenna tuner. Robert Enemark, W1EC, P.O. Box 1607, Duxbury, MA 02331 (781) 585-6233

WANTED—PARTS

Cabinet for Zenith 5R236 or junker chassis with good cabinet. Marc Ellis, 1914 Colfax St., Evanston, IL 60201; 847-869-5016; mfellis@rcn.com

About Our Authors

Author Bengt Svensson's biography was not available as The OTB went to press. We'll try to include it in "About our Authors" for January, 2005.

STAN HOJNACKI, WA2NPL.

A Home-Brew SW-3-Inspired Receiver
(In "The Communications Receiver")

Stan was first licensed at 15 as a Novice, attained a General 8 months later and then took 18 years to get around to Extra. He's presently an Engineering Technician for the Lockheed-Martin Corporation. His career began at RCA (Camden, NJ) in 1980. At that time RCA was a fully self-sufficient manufacturing company and Stan was involved in every stage of product development from post engineering to final shipping. His interest in vintage radio began with his first look at a Fair Radio Sales catalog. He has been a member of the AWA since 1981.



BART LEE, KV6LEE

BVWS Throws a Garden Party

Bart has published widely on radio history and worked on several preservation initiatives, especially for the California Historical Radio Society, which honored him with its "Doc" Herrold Award. In 2003, he received The Antique Wireless Association's Houck Award for Documentation.

He maintains his interest in the technology of radio, which began with crystal sets almost 50 years ago. Long-term hobbies include Amateur radio operation, short wave listening and vintage radio collecting.

Bart served as an amateur radio operator and communications manager with the Red Cross in New York during September 11, 2001 and its aftermath. He lives and practices law in San Francisco, California and invites correspondence: kv6lee@att.net.



ALLAN PELLNAT, KX2H

Radio Operating in a Museum Ship

Allan has been a licensed amateur for fifty years as of the publication of this issue of *The OTB*. He has been a member of the museum volunteer workforce since his retirement in 1998 and is a member of the AWA board of directors and

the museum's board of trustees. He also serves as deputy director of the museum. Allan's working career began with AT&T as a Telegraph Serviceman and ended with Nortel Networks as a systems engineer working on automated directory assistance services. His participation in the operations on *USS North Carolina* reflect his particular interest in the lives of the people who built the radio industry and operated radio equipment. Since moving to North Carolina earlier this year he has been researching the links between the early ham radio community in his new hometown of Wilmington and the development of broadcasting in that area.



FRANKLIN L. POPE

Relays, Keys, Registers and Sounders (In "Key and Telegraph")

Franklin Pope was respected and influential 19th century telegraph engineer and author. This article originally appeared in *The Telegrapher* for July 27, 1872.



JAMES P. RYBAK, W0KSD

Vladimir K. Zworykin's Contributions to the RCA Electronic Television System: Part I—The Kinescope

James Rybak was born in Cleveland, Ohio in 1941. He has been interested in both radio and electronics, first as a hobby and then as a profession, for over 40 years. Jim holds B.S., M.S., and Ph.D. degrees in electrical engineering as well as Extra-Class amateur radio license W0KSD. He teaches engineering and mathematics at Mesa State College in Grand Junction, Colorado. In recent years, Rybak has published numerous articles in the U.S. and abroad on the history of both wireless and electrical technology. When not writing articles, he spends his free time trying to achieve "Worked All States" through the low-earth-orbit amateur radio satellites as well as trying to become knowledgeable about digital photography and slow-scan television.

BUSINESS CARD ADS

Are you offering a product or service of interest to antique radio enthusiasts? Would you like to let the world know about the tubes, sets or paper you'd like to acquire? Place a business card in this space for the low price of \$15.00 and it will be seen by over 4,000 hard core devotees of our hobby. Purchase a year's worth of insertions (four issues) for \$50.00 and save \$10.00 over the individual ad pricing.

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Because of the unexpected passing of Advertising Manager Robert Perry (see "Silent Keys"), our records of newly requested ads and advertising expiration dates are temporarily unavailable. We are working to reconstruct the records, but in the meantime the ads from the July issue are repeated here. Please bear with us.

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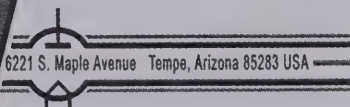
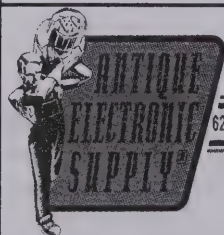
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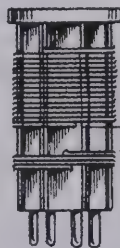
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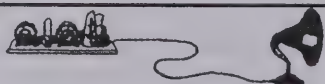


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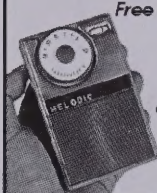
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0.006	602K630V	0.18	184K630V	
0.0068	682K630V	0.2	204K630V	
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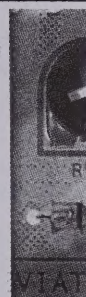
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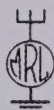
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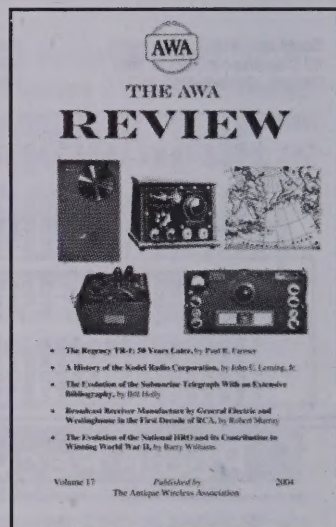
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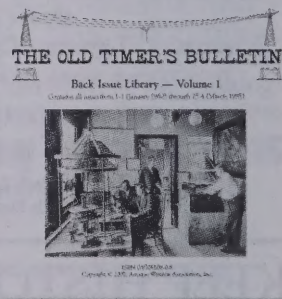
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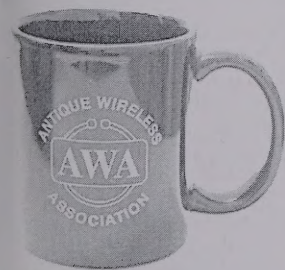
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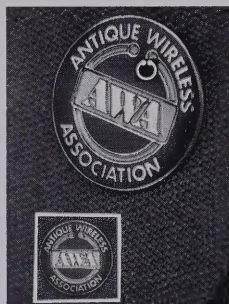
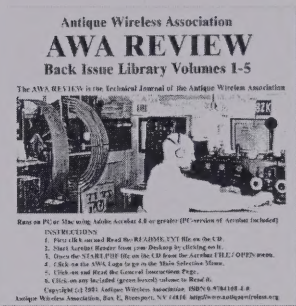
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